Summary of Water Infrastructure in the St. Louis Region

June, 2013
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Executive Summary

Introduction
The history of St. Louis is linked to water. At the confluence of not only the Mississippi and Missouri Rivers, but other significant rivers such as the Kaskaskia and Meramec, water in the St. Louis region provides us with a supply of water, recreational opportunities, important ecological benefits, and transportation networks.

In regards to water supply, the St. Louis region is in a very enviable position compared to other regions of the country. Unlike areas of the country such as the southwest and southeast, the St. Louis region typically has an abundant water supply. Even during the drought of 2012 and historically low river levels, water supply in the St. Louis region was generally not a critical factor.

However, there is often a lack of awareness of the importance of our water resources in the St. Louis region. When we go into our kitchen to turn on our faucet for a glass of water, we take it for granted that we will have clean, fresh water. In fact, the St. Louis region has some of the best drinking water in the nation, with the St. Louis City Water Division winning the U.S. Council of Mayor’s taste test award for drinking water in 2007. We also take for granted our wastewater system. As we flush our toilets or drain our water, we usually do not stop to consider where the water goes or the steps involved ensuring that the wastewater is cleaned before being returned to our lakes, rivers, and streams.

The St. Louis region has an opportunity to position itself within the nation as a sustainable region for growth and investment because of our water supply and resources. Historically, water has been thought of as a “free commodity”, and in the St. Louis region and many parts of the country, water supply still is very inexpensive.

But the equation is changing. Reduced water supplies in many parts of the country and the need for water infrastructure investment is raising awareness (and the cost) of water all over the country.

The St. Louis region is not exempt of water infrastructure needs. As this report outlines, huge investments in drinking water and wastewater infrastructure is needed in the St. Louis region to replace aging infrastructure, meet regulatory requirements, and plan for future needs. The region also needs to manage its water resources to ensure clean water supplies, protect ecological resources, and provide recreation and transportation access. It will be a challenge, but if successful, the St. Louis region can leverage its abundant water resources toward prosperity.

Goals of this Report
The goal of this report is to provide a brief, high level assessment of water infrastructure in the St. Louis region. In this report, water infrastructure refers to drinking water and wastewater. Storm water was discussed in regional stakeholder meetings as part of the regional water infrastructure, but stormwater is not the focus of this report.

The outcomes of this high level assessment of water infrastructure in the St. Louis region, includes:

- Assessments of strengths, weaknesses, threats, and opportunities for our water infrastructure.
- Recommendations for water infrastructure in context of the St. Louis OneSTL plan.
Methodology
This report on regional St. Louis water infrastructure is a broad, high level assessment. The intent of this report is not to provide a detailed or comprehensive assessment. The methodology to compile this report included a review of relevant plans and reports, both nationally and regionally, focusing on water infrastructure. This review of plans and reports was supplemented with stakeholder interviews of water and wastewater utilities. The process included:

• Review of recent precedent water infrastructure reports from regulatory agencies, trade associations, and professional societies.
• Review of regional water infrastructure analysis needs gathered from a sampling of county and community comprehensive plans in the St. Louis region.
• Review of best practices and recommendations from other regional sustainability plans.
• Interviews with water and wastewater utilities in the St. Louis region.

For this report, the St. Louis region is defined as the metropolitan planning area of the East West Gateway Council of Governments. Counties in Missouri include: City of St. Louis, St. Louis County, St. Charles County, Jefferson County, and Franklin County. Counties in Illinois include: Madison County, St. Clair County, and Monroe County.

Recommendations

Recommendation #1: Support innovative state and federal funding sources for water infrastructure.
Several proposals have been made in recent years to increase funding for water infrastructure. In 2012, Congress introduced the Water Infrastructure Finance and Innovation Act (WIFIA) modeled after the Transportation Infrastructure Finance and Innovation Act (TIFIA). WIFIA would provide a system for loans, loan guarantees, or other credit support at long-term U.S. Treasury rates for water infrastructure projects. WIFIA programs should be made equally available to all water utilities including municipal, water district, and investor owned systems. Lower interest rates for water infrastructure projects would increase the amount of investment a utility and its customers could make, with the same amount of dollars.

Other proposed state and federal funding have included: increased state revolving loan funds, changes in the federal tax code to enhance local government access to private capital funds, continued tax exemption for municipal bonds, and federal funding for federally passed environmental mandates.
Recommendation #2: Promote the St. Louis region’s strength in water supply through greater promotion by the Regional Chamber of Commerce and other economic development agencies.

Historically, with easy access to the Missouri and Mississippi rivers, the quantity of water for the St. Louis region has not been an issue. Overall, the St. Louis region has an abundant water supply to meet current and future needs. St. Louis should be able to leverage its strength in water supply compared to other regions of the country including the southwest and southeast where water supply is generally more limited and expensive.

Currently, regional economic development agencies promote regional infrastructure benefits such as the St. Louis region’s central location, multi-modal strengths, and low congestion. Water supply should be another strength promoted by regional economic development agencies.

Recommendation #3: Develop a comprehensive regional plan for water supply and wastewater that will fully document aging infrastructure and create strategies for critical threats to water quality such as malfunctioning septic systems and other regional needs.

There has not been a comprehensive regional plan for water infrastructure in the St. Louis region since the early 1970’s. One benefit of a comprehensive regional plan for water infrastructure would be the collection of data and information to better raise awareness of the critical need of aging water infrastructure in the St. Louis region. Mapping of critical areas of need would better raise awareness with elected officials and the public of the problem. While there is greater sensitivity in compiling and sharing infrastructure information because of security reasons, a regional plan could keep data confidential and share data in a manner that would not compromise necessary security.

Transportation planning is a good example of regional planning and data collection to better prioritize and raise awareness of critical needs. Maps of congestion, road conditions, and traffic volumes are examples of data that have been used to raise awareness of transportation infrastructure issues.

A regional example of using data to show the need for infrastructure was the new Mississippi River Bridge, scheduled to open in 2014. During the late 1990’s, while the bridge was still in the early planning stages, data and maps showing St. Louis as a critical route for national interstate traffic made a strong case for the necessity of the new bridge. (See Figure 1 for the example of this graphic.)

Water and wastewater utility personnel often note that the public is unaware of the critical condition of aging water infrastructure. The public is often unaware, because unlike other types of infrastructure
such as roads and bridges, water infrastructure is usually unseen, buried underground.

There has been many successful efforts regionally and nationally to raise public awareness of water infrastructure. Regionally, the Metropolitan Water Infrastructure Partnership (MWIP), a partnership of regional water and wastewater utilities, has raised awareness through the 2011 publication of ‘Our Aging Infrastructure’, presentations, and outreach. The American Society of Civil Engineers (ASCE) releases a regular report card on the condition of infrastructure, including drinking water and wastewater. These are just two examples, and many individual utilities also provide information and campaigns for awareness building.

To fully address the need for future water infrastructure investment, additional public awareness and support will be required. A regional water infrastructure plan would help further raise awareness.
Recommendation #4: Provide equal access for urban and private water and wastewater utilities to the State Revolving Loan Funds.

There are two types of State Revolving Loan Funds (SRF), the Clean Water State Revolving Loan Fund (CWSRF) and the Drinking Water State Revolving Loan Fund (DWSRF). The SRF has been an effective tool, especially for small to medium utilities for water infrastructure. However, there are limitations to the SRF that particularly affect the St. Louis region. One, SRF loans are typically capped. The American Water Works Association found that the average loan cap is about $20 million, and may be less depending on the state. For urban projects, a $20 million cap can be easily exceeded. Second, access to the CWSRF is limited to public utilities. Access by private utilities to the CWSRF would increase investment.

Recommendation #5: Continue to raise awareness with elected officials, the business community, and the general public of the aging water infrastructure in the St. Louis region.

A 2010 nationwide survey by the ITT Corporation for their Value of Water Survey found that 69% of voters agreed that they take their access to clean water for granted. Because much of our water infrastructure is underground and out of sight, most people do not think about our water infrastructure unless there is a water main break, sewer collapse, or boil water order.

Progress is being made in raising awareness. A 2011 survey by the Metro Water Infrastructure Partnership (MWIP) in the St. Louis region found that 65% of 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.

Increased public awareness will be required in the future to compliment and expand existing efforts. Raising awareness of water infrastructure should increase on multiple levels including awareness of aging distribution systems and facilities, and awareness of ensuring clean water supplies by utilizing green infrastructure.
**Recommendation #6:** Continue and expand regional efforts in advocating for local, state, and federal water infrastructure policy and funding issues.

In recent years, there have been successful efforts to create a regional voice for water infrastructure. The Metro Water Infrastructure Partnership (MWIP) was formed in 2009 by regional utility and non-utility organizations to raise awareness about aging water and wastewater infrastructure in the bi-state St. Louis region. Additional partners in the MWIP or the inclusion of additional regional groups such as the St. Louis Regional Chamber would further strengthen the voice for water infrastructure issues.

The advantages of a regional voice and advocacy for water infrastructure include:

- Regulatory issues
- State and Federal funding opportunities
- Raising awareness with elected officials, the business community, and the general public on aging water infrastructure

In addition, a regional network helps ensure that the St. Louis region is part of national discussions related to water infrastructure. Recently, the St. Louis region was left out of Circle of Blue national survey for water supply and wastewater. A strong regional advocacy group will help ensure St. Louis inclusion in such surveys, if not by population size, at least by “regional representation”.

**Recommendation #7:** Utilize green infrastructure strategies at a watershed scale to ensure quality of surface and ground water for drinking water supplies.

Surface and well water is a major source of drinking water for the St. Louis region. Whether it is river, lake, reservoirs, or wells, protecting the water quality of our drinking water should be a priority. Green infrastructure strategies at a regional and watershed scale should be utilized to ensure water quality of regional water supplies.

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Figure 2: A regional green infrastructure network has many benefits including improved regional water quality and water supply protection.
Goals and Objectives

The goal of this report was to provide a high level assessment of water infrastructure in the St. Louis region. Water infrastructure in this report focuses on drinking water and wastewater. Storm water was discussed in regional stakeholder meetings as part of the overall discussion of regional water infrastructure, but storm water is not the focus of this report.

Assessment of regional water infrastructure was a qualitative assessment at a very broad scale. A detailed quantitative assessment at a regional scale was beyond the scope and intent of this report. The key aspect of this report was to provide broad recommendations and, most importantly, next steps to advance water infrastructure planning in the St. Louis region in the context of the OneSTL Plan. The OneSTL plan is a regional plan for sustainable development led by the East West Gateway Council of Governments and ten regional core partners.

The scope of work per Activity 4, Task 6(e) of the work plan stated: “In conjunction with East-West Gateway and ARC, identify strategies for water and sewer infrastructure investments, including where new systems are needed and existing systems can be upgraded.”

The work that provided the basis of this publication was supported by funding under an award with the U.S. Department of Housing and Urban Development through East-West Gateway Council of Governments. The substance and findings of the work are dedicated to the public.

The author and publisher are solely responsible for the accuracy of the statements and interpretations contained in this publication. Such interpretations do not necessarily reflect the views of the Government or East-West Gateway.
SWOT Analysis

**Strengths**

The St. Louis region has an abundant water supply. Historically, with easy access to the Missouri and Mississippi rivers, the quantity of water for the St. Louis region has not been an issue. Parts of the region, especially those areas that depend on lakes and reservoirs for supply, have had to manage water more carefully during periods of drought. Overall, however, the St. Louis region has an abundant water supply to meet current and future needs, especially compared to other parts of the country.

The cost of water is low compared to other parts of the country. The St. Louis region has low drinking water rates compared to other parts of the country. A 2009 survey put the average St. Louis household monthly cost for water at $20.59 a month compared to a national average of $23.43 a month. More recently, a 2013 survey found monthly household water bills ranged greatly. A few examples of monthly household water bills from the 2013 survey included: $27.12-$54.24 (Chicago), $31.38-$53.04 (Indianapolis), and $47.64-$91.92 (Atlanta). Although water rates are expected to rise in the St. Louis region to meet infrastructure needs, other parts of the country are also expected to have increased water rates. One disadvantage in comparing water rates is that the St. Louis region is being left out of many national surveys for water supply and wastewater, due to the size of the region.

Less fragmentation than other parts of the country.

Even though the St. Louis region has over 91 municipalities, there is less fragmentation in terms of water infrastructure. American Water (Missouri American and Illinois American) provide substantial water supply coverage in the region. For wastewater, the Metropolitan St. Louis Sewer District (MSD) covers the entire City of St. Louis and a majority of St. Louis County. Many other regions of the country have greater fragmentation in terms of water infrastructure. An American Water Works Association report found that nationally, 84.5% of community water systems serve fewer than 3,300 people. Less fragmentation means that cost for new and replacement infrastructure can be more equitably spread over a larger customer base.
**Weaknesses**

**Aging water infrastructure.**

Many areas of the St. Louis region have water and wastewater infrastructure and facilities that are past or nearing their useful life expectancy. Water and wastewater mains often last between 80-100 years. Many areas of the region have infrastructure over 100 years old. A 2011 report by the Metro Water Infrastructure Partnership (MWIP) gave an overview of water supply and wastewater infrastructure in the bi-state St. Louis region by expected life and current average age (See Figure 2). Aging infrastructure is not limited to the core of the region. Many outlying communities and small towns in the region have water supply and wastewater lines from the 1940’s, 1930’s, 1920’s or older.

Besides piping, infrastructure needs include: pumping stations, storage tanks, treatment plants, and reservoirs and dams.

The St. Louis region is not unique in having aging water infrastructure. Most regions of the country are grappling with aging water infrastructure. Recent reports highlight the magnitude of the issue:

- The American Water Works Association estimates that the national need for water supply piping alone (replacement and new growth) will be over $1 trillion dollars over the next 25 years (2011-2035).[^3]
- The American Water Works Association estimates that replacement investment will roughly double by the 2040’s from current levels.[^3]
- In 2007, the EPA estimated the 20-year national need for public water systems was $334.8 billion dollars.[^13] The EPA estimate was for public systems and for projects eligible for Drinking Water State Revolving Fund (DWSRF) which typically is for projects necessary for regulatory compliance, and does not include new growth or all replacement costs.
- The U.S. Conference of Mayors estimates that a tripling of investment may be needed.[^20]

While estimates of future water infrastructure costs vary, the reports above show that there is consensus that a large increase of investment will be needed for future replacement and growth.

![Figure 3: Average age and expected life of water infrastructure in the St. Louis region. (Source: ‘Our Aging Water Infrastructure’, MWIP, 2011)](image-url)
Weaknesses – cont.

Combined sewer overflows.
The EPA defines combined sewer systems as, “sewers that are designed to collect rainwater runoff, domestic sewage, and industrial wastewater in the same pipe. Most of the time, combined sewer systems transport all of their wastewater to a sewage treatment plant, where it is treated and then discharged to a water body. During periods of heavy rainfall, the wastewater volume in a combined sewer system can exceed the capacity of the sewer system or treatment plant. For this reason, combined sewer systems are designed to overflow occasionally and discharge excess wastewater directly to nearby streams, rivers, or other water bodies.” Many older communities in the St. Louis region have combined sewers including St. Louis City, Granite City, and Belleville, among others.

The EPA issued a CSO Control Policy in 1994 intended to eventually bring CSOs nationwide into compliance with the Clean Water Act. The policy requires agencies with CSOs to prepare a Long-Term Control Plan (LTCP) describing how they will accomplish these goals.

The negative impacts of combined sewers are twofold. One, there are environmental and water quality impacts when raw sewage is discharged to streams, rivers, or other water bodies. Second, the cost to eliminate combined sewer overflows is high. From 1992 to 2011 the Metropolitan St. Louis Sewer District (MSD) spent over $2.5 billion dollars to eliminate over 350 overflows. In 2013, an agreement between EPA and MSD was finalized that entails spending $4.7 billion over 23-years to further address overflows.[17] These costs lead to higher wastewater bills for customers.

Impaired surface waters.
Missouri and Illinois have numerous streams, rivers, and lakes that do not meet EPA water quality standards and are on the EPA 303(d) list. The 303(d) list is the list of impaired and threatened waters (stream/river segments, lakes) where required pollution controls are not sufficient to attain or maintain water quality standards.
Threats
Cost of replacing aging infrastructure, meeting regulatory requirements, and new facilities will raise rates and lessen the economic advantage for the St. Louis Region.
Currently, the St. Louis region enjoys some of the lowest water rates in the country. However, rates will likely rise to meet the cost of water infrastructure replacement and investment. Other regions of the country are also raising water rates. A 2013 Circle of Blue report surveyed water rates for 30 metropolitan areas. The report showed rates rose by 25% since 2010, with several metropolitan regions including Chicago, Los Angeles, and San Francisco experiencing a double digit percentage increase from 2012-2013.\cite{10}

In some parts of the St. Louis region, population loss has resulted in fewer customers to absorb the cost of replacing infrastructure. There is less fragmentation in the St. Louis region than other parts of the country for water infrastructure. However, some sections of the region with population loss have fewer customers to carry the cost of replacing and investing in water infrastructure. This will likely mean future higher per customer cost unless further regionalization and consolidation occurs.

In many parts of the St. Louis region, current rate of line replacement has not kept pace with actual replacement needs. Currently, in many areas of the St. Louis region, the existing rate of water main replacements is 0.4% - 0.7% of existing mains per year.\cite{18} The rate should be approximately 1% per year to avoid increased levels of system failures.\cite{18} Delaying replacements corresponds with higher costs and rate increases in the future.

Pressure to expand the State Revolving Loan Funds (SRF) for new infrastructure to address growing populations, especially in the southwest and southeast parts of the country, could help other parts of the county more than the St. Louis region.
Expanding the SRF to include funding for new infrastructure may be a potential disadvantage for the St. Louis region. SRF traditionally has been designated only for investment in existing water infrastructure. Expansion of the SRF, for new systems and lines to meet service area growth, would likely encourage development in water short regions of the country (the southwest and southeast where there is extensive new urban growth) instead of where water is plentiful such as the St. Louis region.

Malfunctioning on-site septic (individual sewage disposal) systems can lead to contamination of ground and surface water.
A 2010 study by the East West Gateway Council of Government of individual sewage disposal systems in areas of the Lower Meramec watershed, found that 30-50% of the systems could be malfunctioning.\cite{11} In the National Water Quality Inventory 1996 Report to Congress, state agencies designated the top 10 potential contaminant sources that threaten their ground water resources. The second most frequently cited contamination source was septic systems. The report states that “improperly constructed and poorly maintained septic systems are believed to cause substantial and widespread nutrient and microbial contamination to ground water.”\cite{11}

Degradation of water quality.
While the St. Louis region has the advantage of numerous water supplies from surface water (river, lakes, and reservoirs) to alluvial aquifers, the region must be continually vigilant in protecting water quality from threats such as point and non-point source pollution.
Threats – cont.

Increased regulation that could further increase cost for compliance without significant benefits.
The U.S. Conference of Mayors is one organization that has asked for greater cost benefit analysis of proposed regulations. The concern is that the cost for meeting some regulations is greater than the benefits achieved. The U.S. Conference of Mayors has recommended that costs to comply with future regulatory requirements be federally funded, instead of placing the burden for compliance at the local level.

Opportunities

The St. Louis region has an opportunity to leverage its abundant water supply as an economic development advantage.
Historically, with easy access to the Missouri and Mississippi rivers, the quantity of water for the St. Louis region has not been an issue. The St. Louis region has an abundant water supply to meet current and future needs. St. Louis should be able to leverage its strength in water supply compared to other regions of the country including the southwest and southeast where water supply is generally more limited and expensive.

Strengthen the regional voice in advocating for state and federal water infrastructure policy and funding issues.
In recent years, there have been successful efforts to create a regional voice for water infrastructure. The Metro Water Infrastructure Partnership (MWIP) was formed in 2009 by regional utility and non-utility organizations to raise awareness about aging water and wastewater infrastructure in the bi-state St. Louis region. Including additional partners in the MWIP such as the St. Louis Regional Chamber and the water resources committee of the East Gateway Council of Governments would further strengthen the voice regarding water infrastructure issues.

Often, the difficulty of a regional group is finding common agreement on priorities amongst its members. Issues such as urban versus rural systems, older versus newer systems, and large versus small systems, are just a few potential differences. However, expanding and strengthening the regional work already done by MWIP and others would create long term benefits.

Collaboration by smaller districts to achieve economies of scale and greater regional attention.
Smaller water and wastewater districts could achieve greater cost savings by collaborating on staffing, materials, and projects.

Innovative state and federal funding sources for water infrastructure.
Several proposals have been made in recent years to increase funding for water infrastructure. In 2012, Congress introduced the Water Infrastructure Finance and Innovation Act (WIFIA) modeled after the Transportation Infrastructure Finance and Innovation Act (TIFIA). WIFIA would provide a system for loans, loan guarantees, or other credit support at long-term U.S. Treasury rates for water infrastructure projects. Lower interest rates for water infrastructure projects would increase the amount of investment a utility and its customers could make, with the same amount of dollars.
Summary of Local Conditions

Drinking Water
The St. Louis region is fortunate to have an abundant water supply. The two main sources of drinking water in the St. Louis region are: wells and surface water. Surface water includes lakes, rivers, and reservoirs. For supply from rivers, regional water systems draw water from the Missouri, Mississippi, Meramec, and Kaskaskia rivers.

Types of Water Utilities
In the St. Louis region, drinking water is supplied by municipal systems, which are owned and operated by local governments, and investor-owned systems. An example of a large public utility is the City of St. Louis Water Division, which operates two water treatment plants and provides water for the City of St. Louis. An example of an investor-owned system is American Water which provides water distribution to more than 700,000 customers in Missouri and Illinois. American Water also provides wholesale water distribution to public municipal water utilities and other customers. Although American Water is the largest supplier of water in the St. Louis region, the region still has numerous water utilities. A 2002 EPA study reported over 200 water systems in the eight county St. Louis region.[1]

Abundant (but cautious) Supply
While St. Louis historically has had an abundant supply, areas of the region where supply comes from lakes, reservoirs, and wells have had restrictions in the past during periods of drought. Supply from rivers, even during the historically low river levels in 2012, were not significantly impacted. However, low river levels do increase the cost of water treatment.

Wastewater
Types of Wastewater
Types of wastewater include sources from homes, commercial, and industrial facilities. It includes human waste, water discharged from our homes (showers, washing machines, kitchen sinks, etc.), businesses (commercial and industrial manufacturing processes), and storm drains. Each of these sources contains various waste products and is ultimately either discharged into surface waters or infiltrates back into the ground.

History of Wastewater in the St. Louis Region
The Clean Water Act (CWA) of 1972 resulted in huge improvements for the treatment of wastewater. In Missouri for example, in 1972, only 17% of Missouri residents received centralized wastewater treatment at the secondary, advanced, or no discharge treatment level. By 2008, 73% percent of residents were benefitting from modern wastewater treatments.[2]

The treatment of wastewater in the St. Louis region varies from large centralized districts such as the Metropolitan St. Louis Sewer District (MSD) to community wastewater treatment plants to on-site systems like septic tanks.

Centralized Wastewater Systems
The largest wastewater service in the St. Louis region is provided by the Metropolitan St. Louis Sewer District (MSD) which serves over 415,000 customers in St. Louis City and the majority of St. Louis County. MSD was formed in 1954 when 79 systems originally owned by subdivisions and local municipalities were consolidated. Prior to 1954, wastewater systems were developed by various municipalities and subdivisions without consistent standards and operating procedures.
Other sanitary districts in the region include the Metro East Sanitary District, Duckett Creek Sanitary District, and individual municipal districts.

**On-Site Wastewater Systems (Individual Sewage Systems)**

On-site systems are not connected to a municipal or sewer district wastewater treatment plant. On-site systems typically consist of a septic tank and a subsurface infiltration system (drainfield). If properly maintained and installed, on-site systems are an effective system for treating wastewater. However, without regular maintenance, on-site systems can fail or malfunction leading to discharges.

**Planning for Wastewater**

The State of Illinois uses the Facility Planning Area (FPA) to aid in evaluating plans for providing wastewater treatment services. A “facility planning area” is where a Designated Management Agency (DMA) may provide wastewater treatment services and can plan for such services over a 20-year planning period.

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**Local Stakeholder Interviews and Local Plans**

Local interviews were conducted with water and wastewater utilities to gain a sense of trends and issues associated with water infrastructure in the St. Louis region. The scope of these interviews was not comprehensive and did not represent all utilities in the St. Louis region. Instead, these interviews provided a snapshot of utilities at various sizes and contexts. Interviews ranged from large systems and districts down to small municipal systems of a few thousand residents.

Samples of various municipal and county comprehensive plans were examined to gain a sense of water infrastructure planning at the county and municipal level. Comprehensive plans were chosen instead of capital improvement plans to better gauge how water infrastructure planning was coordinated with other municipal and county planning such as land use, transportation, and housing.
Summary of Precedent Water Infrastructure Reports

Section Overview
There has been a tremendous amount of research and reports in the last few years in regards to water infrastructure. The reports and research have been done by industry, federal agencies, and regional planning agencies, among others. This section summarizes several recent reports regarding water infrastructure.

This section includes summaries for:
• 2013 Report Card for Missouri's Infrastructure (2013)
• Buried No Longer: Confronting America's Water Infrastructure Challenge (2011)
• Our Aging Water Infrastructure (2011)
• Drinking Water Infrastructure Needs Survey and Assessment. Fourth Report to Congress (2009)
The American Society of Civil Engineers produces a regular report (every 4-5 years) on infrastructure including water infrastructure, roads, bridges, and airports, among others. The ‘2013 Report Card for Missouri’s Infrastructure’ included sections on drinking water and wastewater. The Report Card gave an overview of existing conditions, major trends and initiatives, and the following recommendations:

**Wastewater Recommendations**
- Community assessment of future wastewater costs versus future revenue. Adjust local funding as necessary to meet future needs.
- State and federal funding options need to be thoroughly reviewed and revamped.
- Proactive local actions to upgrade wastewater infrastructure.
- Cost/benefit analysis of new water quality regulations.
- Gain public support of infrastructure improvements.

**Drinking Water Recommendations**
- Create federal and state programs to provide commodity purchase pool for public water utilities to purchase water main pipelines and supporting equipment and supplies for transmission and distribution systems.
- Increase Missouri’s state budget allocation for water infrastructure investment to provide 50 percent matching grants to public water utilities funding for capital infrastructure investment.
• Provide priority on Community Development Block Grants (CDBG) for water infrastructure investments to other programs.
• Establish water operator certification grants as part of its state employment training program.
• Require public water systems to develop an asset management program prior to future participation in Missouri funding and SRF programs.
• Require public water systems to operate as public corporations similar to electric utilities, with user rate structures that account for the full cost of services including the loss of value of systems (depreciation) over time.
• Pass legislation for public water systems to establish adequate reserves for one year of debt service.
• Impose stricter state penalties for community water systems with acute violations of contaminants.
• Place public water systems that fail to comply with federal and state reporting requirements on one-year probation for state grants and other funding mechanisms.
The American Water Works Association produced 'Buried No Longer: Confronting America's Water Infrastructure Challenge' to provide an overview and raise awareness of the needs for drinking water infrastructure. Key findings of the report included:

- **The Needs are Large**
  Just for piping (replacement and new for growth), $1 trillion nationwide needed over next 25 years (2011-2035). In the Midwest, $172 billion needed ($146 billion just for replacement).

- **Household Water Bills Will Go Up**
  In some communities water bills could triple over the next 20-30 years.

- **Important Regional Differences**
  The South region of the United States by itself accounts for approximately half of nationwide totals for future water infrastructure investment needs, mostly due to the fact that these regions are growing rapidly.

- **Important Differences Based on System Size**
  Small communities have fewer customers to spread the cost (more pipe "miles per customer"). A typical three person household could see water bills increase by $550 by the mid-2030's compared to increases of $75-$100 for larger communities.
'Buried No Longer: Confronting America's Water Infrastructure Challenge' – cont.

- Costs Keep Coming
  National level investment will roughly double from $13B a year in 2010 to $30B a year by the mid 2040's for replacement alone.

- Postponing Investment Only Makes the Problem Worse

![Table 2011-2035 Totals](image)

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![Table 2011-2050 Totals](image)

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</table>

Figure 3: Aggregate Need for Investment in Water Mains Through 2035 and 2050, by Region (Source: 'Buried No Longer', American Water Works Association, 2011)
The Metro Water Infrastructure Partnership (MWIP) is a partnership of bi-state St. Louis member utilities. The report ‘Our Aging Water Infrastructure’ was produced to provide an overview and raise awareness of water and wastewater needs in the St. Louis region. The report included:

The Need for Infrastructure Replacement

- In the St. Louis region, currently 0.4% - 0.7% of existing water mains are being replaced on an annual basis. A rate of approximately 1% per year should be the goal to avoid increased levels of system failures.

- 2009 National ASCE report card gave drinking water and wastewater infrastructure a grade of D-.

- An example of the impacts of aging infrastructure is Kirkwood, Missouri where 28 water main breaks a year occurred in the 1980's. Currently, the city experiences approximately 150 water main breaks a year.
'Our Aging Water Infrastructure' – cont.

The Cost of Aging Infrastructure

- St. Louis Region: Currently, the average water and wastewater bill averages 1.4% of household income. In 15-20 years, this ratio will need to increase to 2.3% to meet the requirements of replacing and upgrading aging infrastructure. (Based on a 2011 median annual household income in the bi-state St. Louis region of $53,189. Median Income Source: East-West Gateway Council of Governments)

Fostering Investment

- A 2010 ITT Corporation, Value of Water Survey found that 63% of voters would be willing to pay a little more each month to upgrade our water system to ensure long term access to clean water. 69% of voters agree that they take their access to clean water for granted.

Figure 4: Map of the Metro Water Infrastructure Partnership (MWIP) water districts. (Source: ‘Our Aging Water Infrastructure’, MWIP, 2011)
Key findings of the report included:

- Between 1956 to 2008, local governments spent $3.1 trillion (2008 inflation adjusted dollars) on public water and wastewater system.

- Capital outlays for infrastructure are increasing each year, but the replacement outlays are decreasing as a relative percent increase over previous years.

- Projected investment over the next 20 years will range between 1.5 to 3 times the investment made over the last 53 years.

- Additional factors that could further increase the cost include: population growth, replacement of above ground treatment works that are approaching the end of their useful life, and requirements for more advanced levels of energy intensive water treatment technology to address: increased number of water contaminants from consumer and pharmaceutical products, reuse of wastewater for potable purposes, recovery of brackish groundwater or ocean water for potable purposes.

- EPA is no longer seen as 'partner' to local government, but instead seen as the role of 'prosecutor'. EPA seen has mandating overly costly rules and impossibly short time frames.
Local government is responsible for providing 98 percent of total investments in public water and wastewater systems.

Overview of funding programs included:

**USDA**
Special Evaluation Assistance for Rural Communities and Households (SEARCH) which provides grants to communities fewer than 3,000 in population to prepare studies required to meet environmental standards.

**Rural Homeowners Water-Well Grants** - Grants from $8,000 - $11,000 for rural homeowners to develop water well systems.

**HUD**
Community Development Block Grant (CDBG) has been allowed to be used for water and wastewater infrastructure projects.

**DOC-EDA (The Department of Commerce-Economic Development Administration)** FY1991 to FY2000 EDA provided $1.1B in direct grants to local organizations for investment in public water and wastewater projects.

**Department of the Treasury**
Tax-exempt municipal bonds issued by states and localities are an important mechanism to fund water and wastewater infrastructure projects. Without the tax preferences of tax-exempt bonding, municipalities would likely use commercial bonds to finance infrastructure projects which would result in higher interest rate payments, thus increasing the cost of any project. The value of this exemption in 2006, was approximately $2.6B.

**Clean Water Act State Revolving Fund (CWSRF)**
Started in 1987 as part of amendments to the Clean Water Act, the SRF provides low interest loans to a wide variety of eligible water quality projects. Loan repayments are recycled back into the individual SRF programs. EPA has estimated that over a 20-year loan, a SRF loan will save 18 percent compared to conventional financing.

**Safe Drinking Water Act State Revolving Fund (DWSRF)**
Fashioned after the CWSRF, the DWSRF programs were launched in 1997 as part of amendments to Safe Drinking Water Act.

The U.S. Council of Mayor’s report recommended the following Congressional actions:

- Allocate $50B in funding over 10 years. $3B for sewer overflow infrastructure and $3B for SRF loan funding (for rehabilitation of aging infrastructure, protection of water and wastewater infrastructure, and promote source water availability).
- Fully fund federally-passed environmental mandates and court-ordered consent decrees applicable to water and wastewater systems.
- Increase program/policy flexibility to allow cities to undertake locally designed strategies (green infrastructure and other innovative solutions)
- Remove private activity bonds for water/wastewater from State Volume Caps.
- Identify and remove impediments in the federal tax code to enhance local government access to private capital to fund public water and wastewater infrastructure.
The report recommended the following EPA actions:

• Provide more direct and location/situation-specific technical assistance to cities concerning: asset management, long-range capital planning, and sustainable system pricing strategies.

• Develop EPA regional plans for infrastructure improvements related to climate change.
‘Drinking Water Infrastructure Needs Survey and Assessment. Fourth Report to Congress’
Date: 2009
(Note: The Fifth Report to Congress was released in 2013, but was not included in this summary)
Author: EPA

The U.S. Environmental Protection Agency (EPA) produces a regular report to Congress on the assessment and needs for national drinking water. The 2009 report was based on data from 2007. Previous EPA drinking water infrastructure needs survey and assessment was conducted in 1995, 1999, and 2003.

A brief overview of the report for drinking water included:
- In 2007, the 20-year national infrastructure need was estimated to be $334.8B for drinking water.
- 60% ($200B) of the national need is for transmission and distribution.
- Types of Drinking Water Infrastructure includes: Transmission and Distribution, Treatment, Source, Storage, and other.
- 16% of total national need ($52B), is for compliance with Safe Drinking Water Act (SDWA) regulations.
The U.S. Environmental Protection Agency (EPA) produces a regular report to Congress on the capital needs for a 20-year period for publicly owned wastewater treatment pipes and wastewater facilities, combined sewer overflow corrections, and stormwater management. The data in the report is a summary from a survey of more than 34,000 wastewater facilities and water quality projects. The report includes:

National Needs
Total water quality needs in 2008 equaled $298.1B. Bi-state needs included: $5-$10B in Missouri and $10B-$20B in Illinois. Needs includes wastewater treatment, pipe repair, and new pipes, combined sewer overflow (CSO) correction, recycled water distribution, and stormwater management.

Strategies for Sustaining Infrastructure
- Management Strategies: Asset Management plans and strategies allow utilities to optimize costs by not replacing infrastructure too early or too late.


- Efficiency through Collaboration: Economies of scale can be achieved by smaller water utilities through sharing of bulk purchases (e.g., chemicals), staff, and management.

- Sustainable Pricing: Steady increases in water and sewer rates, instead of later larger increases, to meet the rate of inflation and infrastructure investments.
The report by the Chicago Metropolitan Agency for Planning provides an overview and recommendation for various wastewater treatments, including: urban and community wastewater treatment facilities, on-site septic systems, and on-site treatment systems. The report also provides an explanation and outlines benefits of Facility Planning Area (FPA) process.

Recommendations of the report included:

- Regional approach to wastewater facilities focusing on facilities that can serve multiple communities.
- Utilizing new and innovative technologies such as Membrane BioReactor (MBR) and nanofiltration.
- Generation of Class A biosolids from treatment facilities residuals.
- Evaluation of on-site land treatment alternatives.
- Water reuse.
- Watershed planning.
- Non-point source management tools at county and local level.
- Facility planning area amendment review. Since FPA amendments occur early in the development process, it is the ideal time to consider alternative point source treatments.
- Utilize wetland polishing lagoons.
Summary of Other Regional Sustainability Plans, Water Infrastructure Sections

The Tomorrow Plan, Des Moines, Iowa
The Tomorrow Plan does not provide specific sections for regional drinking water and wastewater. Drinking water and wastewater is addressed in other sections such as natural resources and green infrastructure strategies. The plans discusses examples of regional authorities such as the Metropolitan Council of Minneapolis-St. Paul, Minnesota which has authority for several regional issues including transportation, waste-water treatment, and regional parks in the seven-county Twin Cities metro region.

GoTo 2040, Chicago, Illinois
Addresses water conservation and water supply. References recently completed ‘Water 2050,’ which predicted a possible increase in water demand between 36% and 64% between 2005 and 2050.

Recommends consolidating smaller water supply utilities and wastewater systems to achieve better economies of scale. For example, over 300 water supply utilities currently provide water in the Chicago region.

Discusses the need to address barriers at state and federal policy levels that could have huge impacts on water infrastructure. While not holistic in its analysis, one example of state policy is the Clean Water State Revolving Fund (CWSRF). The Fund was created to help pay for improvements to publicly owned wastewater treatment plants. A consequence of the construction of wastewater capacity is that it supports development of greenfield sites. A consequence of greenfield development is the tendency to degrade water resources in those areas.
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Recommendations for Water Infrastructure in the St. Louis Region