



City of West Plains

Integrated Management Plan  
for Wastewater, Stormwater,  
and Drinking Water

**DRAFT**

Columbia, MO  
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# 1. Introduction and Background

The City of West Plains, Missouri (City) is currently facing significant infrastructure challenges that will impact planning decisions and drive investments over the next several decades. This integrated plan includes a 30-year planning period that prioritizes the recently identified capital investments to their wastewater, drinking water, and stormwater management systems. The need for these infrastructure investments is caused by a variety of issues including aging and failing infrastructure assets, regulatory compliance, and meeting capacity needs for economic development. In January 2021, the City discussed the impact of implementing these major projects with the West Plains City Council (Council) and found that combined drinking water and wastewater user rates would need to increase by 150% in the first six years, which would cause undue financial burdens for customers.

The City's situation is not unique, as aging infrastructure, increasingly complex water quality issues, and challenging economic conditions have strained municipal utility management and impacted community affordability across the country. In 2011, the US Environmental Protection Agency (EPA) recognized that when afforded the opportunity to use regulatory flexibilities to balance wastewater and stormwater improvements, municipalities can appropriately prioritize and schedule work that is affordable, aligns with community priorities, and meets regulatory obligations<sup>1</sup>. The Missouri Department of Natural Resources (MDNR) also understands the value of integrated planning and supports municipality efforts to develop implementation schedules that align with community priorities and affordability<sup>2</sup>.

In 2012, EPA<sup>3</sup> released the *Integrated Municipal Stormwater and Wastewater Planning Approach Framework* (Framework), which outlined the guiding principles and elements that municipalities should follow if they wish to pursue this integrated planning approach. In January 2021, EPA<sup>4</sup> acknowledged that the cost of drinking water system improvements also impacts ratepayers and should be considered in long-term infrastructure planning efforts. EPA's six planning elements include:

**Element 1:** A description of the water quality, human health, and regulatory issues to be addressed.

**Element 2:** A description of existing wastewater and stormwater systems under consideration and summary information describing the systems' current performance.

**Element 3:** A process which opens and maintains channels of communication with relevant community stakeholders in order to give full consideration of the views of others in the planning process and during implementation of the plan.

**Element 4:** A process for identifying, evaluating, and selecting alternatives and proposing implementation schedules.

**Element 5:** A process for evaluating the performance of projects identified in a plan.

**Element 6:** An adaptive management process for making improvements to the plan.

In 2021, the City was awarded an MDNR technical assistance grant through the Missouri Public Utility Alliance (MPUA) Resource Services Corporation to develop an Integrated Management Plan (IMP) that

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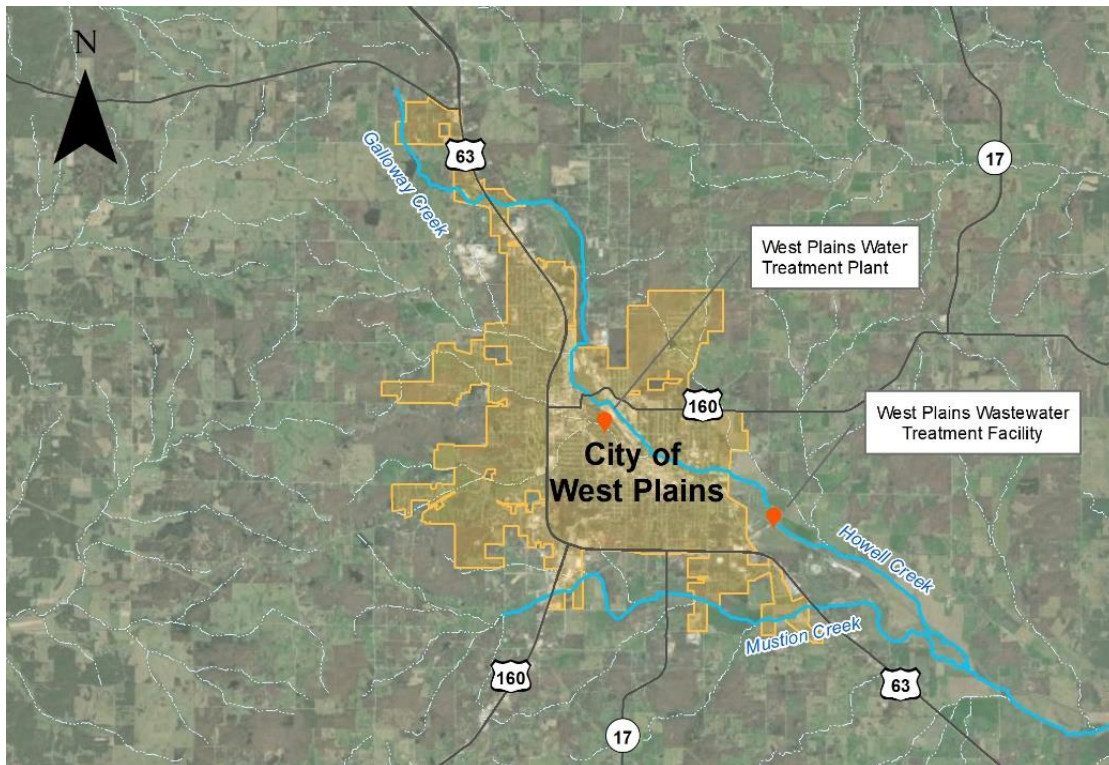
<sup>1</sup> Stoner, N. and C. Giles. 2011. *Achieving Water Quality through Integrated Municipal Stormwater and Wastewater Plans*. October 27, 2011. Washington DC.

<sup>2</sup> Hirschvogel, L. 2016. *Missouri Integrated Planning Framework*. Water Protection Program. Jefferson City, Missouri.

<sup>3</sup> Stoner, N. and C. Giles. 2012. *Integrated Municipal Stormwater and Wastewater Planning Approach Framework*. June 5, 2012. Washington DC.

<sup>4</sup> EPA. 2021. *2021 Financial Capability Assessment Guidance*, pre-publication version. Office of Water. Washington, DC.

aligns with EPA's 2012 Framework. This document summarizes the results of the City's planning efforts. Specifically, the IMP outlines affordable wastewater, drinking water, and stormwater system improvements and implementation schedules that address the City's known infrastructure challenges, improve water quality, and provide regulatory certainty over the next 30 years. Results from this planning effort will be used to inform future capital improvement projects and extend Clean Water Act compliance schedules to maintain community affordability over the planning period.



**Figure 1. City of West Plains IMP Planning Area.**

The IMP reflects the City's understanding of infrastructure needs and regulatory priorities over the next 30 years with respect to the information currently available. As described in EPA's Framework, integrated planning is an iterative process that should be reevaluated as needs change over time. Consistent with this principle, the City intends to update the IMP at least every five years to address changes in community priorities, regulatory initiatives, economic conditions, technological developments, and system understanding. This adaptive management approach provides the opportunity for the reprioritization of projects and programs through informed decision-making to yield a dynamic and living long-range plan.

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## 2. Establish the IMP Vision (Element 1)

Element 1 of EPA’s framework involves identifying the important regulatory, environmental, human health, and infrastructure issues that will be addressed in the plan. Early in the planning process, the City identified a set of goals and issues that should be addressed by the IMP<sup>5</sup>.

The City’s IMP goals are as follows:

- **Appropriately sequence necessary wastewater, drinking water, and stormwater improvements** - Recent wastewater and drinking water master planning efforts have identified significant capital improvements that are needed to achieve regulatory requirements, meet customer demands and service needs, and repair aging and failing infrastructure. The IMP should identify the most affordable and cost-effective sequencing schedule for those improvements over the next 30 years.
- **Achieve regulatory certainty** - The City faces several evolving state and federal drivers that will impact infrastructure planning for all three systems included in the IMP. The IMP should provide the City with regulatory certainty over the planning period.
- **Maintain affordable rates** - Financial impacts on all City ratepayers must be carefully considered as IMP alternatives are developed or implemented. The IMP project implementation schedule should identify the most cost-effective approach to meet the City’s needs.
- **Consider community priorities** - The City understands that integrated planning is a community-driven process and stakeholder involvement is critical to developing an effective IMP. Over time, the planning process should provide community stakeholders with opportunities to inform IMP projects and schedules.

The final projects and implementation schedules identified in this initial IMP report are consistent with the goals established during the visioning process. Over time, the City will reevaluate these goals and refine them as necessary to address new challenges or community priorities. Revised goals will be documented in future IMP updates.

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<sup>5</sup> [Link to IMP Vision document on City website.](#)

## 3. Evaluate Existing System Performance (Element 2)

Element 2 of EPA’s Framework includes evaluating the existing performance and needs of existing wastewater, stormwater, and drinking water systems. This step helps to identify the potential scope of necessary infrastructure improvements and forms the basis for developing solutions in Element 4.

As part of the existing system performance evaluation, the City performed a comprehensive review of existing assets to gain a better understanding of current infrastructure performance and recommendations for future improvements. Those planning efforts include:

- **Wastewater System** – In 2021, Burns and McDonnell Engineering Company, Inc., completed two evaluations of the City’s wastewater treatment and collection system. Results were documented in a Wastewater Treatment Plant (WWTP) Evaluation (2021 WWTP Evaluation) report<sup>6</sup> and Flow Analysis and Inflow and Infiltration (I/I) Evaluation (2021 I/I Evaluation) memorandum<sup>7</sup>.
- **Stormwater System** – In 2012, Great River Associates, Inc., completed a holistic, three-phased Stormwater System Evaluation and Planning Study<sup>8</sup> (2012 Stormwater Study). Phase I developed a preliminary model of the drainage system, Phase II updated the model with a gap assessment and incorporated additional information at bridges, culverts, and updated flow data, and Phase III identified and prioritized project areas to mitigate flood prone areas.
- **Drinking Water System** – In 2019, Gonzalez Companies, LLC completed a Water Treatment Facility Master Plan<sup>9</sup> (Water Master Plan) for the City’s drinking water system. In 2020, Toth and Associates, Inc., used information from the plan to develop a Bond Level Cost Submittal (BLCS) report<sup>10</sup>.

A summary of the existing system performance is included below.

### 3.1 Environmental and Regulatory Assessment

The City performed a comprehensive review of current and evolving environmental and regulatory drivers to help prioritize known infrastructure needs and identify additional capital or programmatic improvements to address new issues in the future. This assessment included a review of surface water quality conditions and impairments, discharge permit compliance records, and future regulatory issues that may drive wastewater and drinking water infrastructure improvements.

#### 3.1.1 Surface Water Quality Conditions

There are four significant waterbodies located in and around the City. Galloway Creek (WBID 3960), Spradlin Creek (WBID 3960), and Mastion Creek (WBID 3960) are small tributaries to Howell Creek (WBID 2582). The City’s WWTP discharges to Howell Creek. Due to the karst geology of the region, all streams in and around the City are categorized as losing streams. As a result, they remain dry for much of the year and primarily only flow in response to precipitation events. Few water chemistry or stream assessment data from these streams were available for analysis at the time of this report and none of the streams are currently on MDNR’s 303(d) list of impaired waters.

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<sup>6</sup> Link to report on City website.  
<sup>7</sup> Link to report on City website.  
<sup>8</sup> Link to report on City website.  
<sup>9</sup> Link to report on City website.  
<sup>10</sup> Link to report on City website.

### 3.1.2 Clean Water Act Compliance Evaluation

The 2021 WWTP Evaluation report presented a brief overview of existing discharge permit requirements and recent compliance history with respect to permitted effluent limits. The WWTP and accompanying 2021 I/I Evaluations did identify significant wet weather management challenges at the facility and within the sewer collection system, particularly during extended wet weather periods. In those studies, the City measured I/I contributions from each of their six basins and found that nearly 80% of flows originate in basins #1 and #2. They also indicated that wet weather peaking factors are greater than 7:1 across all six basins. Given these wet weather management challenges, initial WWTP upgrade and collection system renewal projects included in this IMP prioritize capacity and conveyance improvements.

### 3.1.3 Future Regulatory Drivers

The City has identified a number of future regulatory issues that could drive future infrastructure investments. A review of these drivers is presented below. It is important to note that many of the regulatory issues described in this section are still evolving. Issues addressed by the IMP were identified based on the City's current understanding of the magnitude and timing of known regulatory drivers. During future IMP updates, it may be necessary to reprioritize projects and implementation schedules based on new or changing regulations as they are developed and implemented at the state or federal level.

- **Nutrient removal requirements:** MDNR is currently considering a rulemaking effort to apply total phosphorus effluent limits for all domestic wastewater treatment facilities that discharge over 1 million gallons per day (MGD). This rule would likely require the City to meet an effluent limit of total phosphorus to be 1 mg/L as an annual average within the next ten years.
- **Ammonia Criteria Revisions:** In 2013, EPA finalized new water quality criteria recommendations for ammonia. The recommendations are based on new toxicity data which demonstrate that some organisms, particularly some species of gill-breathing snails and freshwater mussels, are more sensitive to ammonia than other organisms in the national toxicity dataset used in previous criteria recommendations. The new criteria could potentially result in a 50% to 70% reduction in existing effluent limits. MDNR is currently considering the EPA ammonia recommendations and but has not indicated if they will initiate a rulemaking to apply the recommendations in Missouri. For planning purposes, the City is conservatively planning that MDNR will adopt EPA's recommendations and apply lower limits at the WWTP within the next 10 years.
- **Recreational Water Quality Criteria Revisions:** For some time, EPA has been developing coliphage (virus) criteria to protect recreational uses because the underlying science suggests that it is a more effective indicator for predicting the risk of gastrointestinal illness than traditional bacteria criteria. Lower bacteria criteria or new virus criteria may result in new stream impairments and higher load reduction requirements through future TMDLs. New virus criteria may also necessitate disinfection upgrades at the City's WWTP. The City anticipates that EPA may release their draft recommended changes sometime during 2022. MDNR would need to adopt these criteria before directly impacting the City through permitting or TMDL implementation. The City will continue tracking this issue to determine if future IMP updates will be needed to address them.
- **Per- and polyfluoroalkyl substances:** Per- and poly-fluoroalkyl substances (PFAS) are a broad category of over 4,000 manmade chemicals which have served many purposes in industrial and consumer product applications including firefighting foam, metal plating and finishing, non-stick and waterproof coatings. In recent years there has been heightened concern over PFAS due to its widespread use, potential health effects, and persistence in the environment. In October 2021, EPA published its update to its PFAS roadmap detailing research, regulatory, and remedial steps

it plans to take to address this issue over the next several years. The roadmap outlines numerous regulatory actions under the Safe Drinking Water Act (SDWA), Clean Water Act, Comprehensive, Environmental Response, Compensation and Liability Act (CERCLA), Clean Air Act and Toxic Substances Control Act (TSCA). Although the timing is currently unclear, regulations and monitoring requirements resulting from EPA's roadmap actions have the potential to impact the City's future drinking water, wastewater treatment, and biosolids management programs. The City will continue tracking this issue and incorporate more specific actions or improvements in future IMP updates, as needed.

- **Lead and Copper Rule Revisions:** December 16, 2021, the Lead and Copper Rule Revision (LCRR) was promulgated into 40 CFR 141. Along with the rule revision, EPA announced the development of the Lead and Copper Rule Improvements (LCRI) to support the overarching goal of proactively removing lead service lines (LSLs) and protect public health. EPA intends to promulgate the LCRI in Summer of 2024 ahead of the initial LCRR compliance date of October 16, 2024 to submit the first service line inventory.

The LCRR requires communities to develop a comprehensive service line inventory of both municipal and customer-owned lines by October 16, 2024. It also includes requirements for future service line replacement, corrosion control treatment, increased monitoring, and increased public notification, although all of these requirements may be modified by the LCRI.

For planning purposes, the IMP assumes that the City will conduct an inventory and perform limited replacements over the planning period. Specific cost assumptions for these activities are outlined in Section 5.3. The City will continue tracking this issue and incorporate more specific actions or improvements in future IMP updates, as needed.

- **Missouri's Water Safety and Security Act:** Missouri's Water Safety and Security Act (Act) was passed by the Missouri Legislature in 2020. The Act requires all community water systems serving a population of up to 30,000 people to develop and implement a plan to address cybersecurity, valve inspections and replacements, and conduct annual fire hydrant testing.

## 3.2 Wastewater System Challenges

The City's wastewater system includes a WWTP, 136 miles of sewer lines, and over 3,000 manholes. The WWTP was built in 1979 and underwent upgrades in 1998 and 2002. The WWTP includes a bar screen, grit removal, influent screw pump, oxidation ditch, four clarifiers, sand filter, UV disinfection, aerated sludge holding tank, and sludge is land applied. The design flow of the wastewater treatment facility is 3.0 MGD with an actual flow of 1.8 MGD. The WWTP was designed for peak flow capacity of 7.0 MGD but is currently limited to a peak flow capacity of approximately 3.5 MGD.

The 2021 WWTP Evaluation and 2021 I/I Evaluation identified a number of significant challenges within the existing wastewater system. In particular, aging infrastructure at the WWTP limits treatment efficacy and I/I within the collection system causes peak flow conditions that frequently exceed conveyance and treatment capacity. A brief summary of these issues is provided below. Additional details are available in the 2021 WWTP Evaluation and I/I Evaluation reports.

- **Aging Infrastructure** – Many of the WWTP components are original to the plant and are past their useful life. Further, the hydraulics are compromised due to the under sizing of pipes throughout the treatment plant. The bottlenecks throughout the plant reduce efficiency and effectiveness of the treatment process and can contribute to overflows and bypasses in the system (see Figure 2-1 in



the 2021 WWTP Evaluation report). Although condition data are not currently available for the collection system assets, results of the I/I evaluation and observations from City staff suggest that many of those assets require renewal.

- **Wet Weather Management** – In the Fall of 2020, the City completed a flow and rainfall monitoring program to inform prioritization of basins for future inflow and infiltration reduction. Monitoring results indicate that 80% of I/I flows originate from two of the City’s six sewersheds. These high levels I/I levels can drive influent flows at the WWTP above 7 MGD, which contributes to overflows and bypasses in the system and reduces the City’s ability to effectively convey and treat flows.
- **Asset and Data Management** – The City generally lacks the capacity to collect, store, and analyze condition assessment and asset data across the collection system. As a result, asset renewal efforts have historically focused on conducting emergency repairs to reduce immediate public health and environmental threats. This approach limits the City’s ability to effectively budget and plan for routine repairs needed to renew their systems using a holistic asset management approach.

### 3.3 Stormwater System Challenges

The City’s stormwater system consists of both infrastructure operation and maintenance and the implementation of a Municipal Separate Stormwater System (MS4) permit. To better plan for necessary investments and reduce the risk of flood damage, the City worked through the 2012 Stormwater Study which identified a number of issues that contribute to flooding, erosion, and water quality issues within the service area. These issues include:

- **Capacity and Flooding** – Over thirty structures (see Exhibit 13 in 2012 Stormwater Study) are undersized and contribute to flooding and backwater effects that cause public safety concerns and property damage.
- **Streambank Stabilization** – Twenty-nine areas are within City streams and stormwater conveyances are characterized as having a moderate or high risk for erosion and sediment control. These issues contribute to public safety concerns, property damage, and degraded water quality.
- **Stream Maintenance and Trash** – Debris and trash within the system is widespread. This trash leads to localized flooding and causes water quality and environmental impacts.

In addition to managing the conveyance network, the City is responsible for implementing their stormwater management program and complying with requirements of their Phase II municipal separate storm sewer system (MS4) permit. The City is permitted under a general permit (Permit No. MOR-040033), which was reissued on October 1, 2021. Federal (40 CFR 122.34) and state (10 CSR 20-6.200(5)(A)1-6)) regulations stipulate that MS4 permits include provisions for developing, implementing, and enforcing a stormwater management program and plan (SWMP) to reduce pollutant discharges to the maximum extent practicable (MEP).

The MS4 permit stipulates that the City must maintain an updated SWMP and periodically prepare and submit progress reports to MDNR. The City maintains past progress reports and other information relevant to the MS4 program on their stormwater website<sup>11</sup>.

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<sup>11</sup> <http://wpstormwater.weebly.com/index.html>

### 3.4 Drinking Water System Challenges

The City's water system serves 5,552 residential meters, 143 industrial users, and 1,446 commercial meters. The City operates a 3.7 MGD water treatment plant (WTP) and distribution system with five pressure zones. Source water is obtained from six wells located throughout the City. The current WTP was constructed in 2001 using a proprietary high-rate clarification process known as ACTIFLO®. This process uses a sand-ballasted flocculation method for water clarification.

The City's water supply system consists of six of the City's seven wells with a 7.6 mile raw water supply system. The six working wells are permitted by MDNR (#MO4010853) and five are currently considered to be ground water under the direct influence of surface water. The City's distribution system consists of 158 miles of line, 878 valves, 872 fire hydrants, and two water towers.

The City's Water Master Plan describes the water treatment plant as "functioning properly and meeting all current finished water quality standards." However, the Water Master Plan and BLCS identified several challenges that should be addressed over the next several years to provide the City the systems needed to continue providing reliable and safe drinking water. The key issues identified are aging infrastructure, flow, storage, raw water supply and regulatory drivers.

- **WTP Infrastructure** – The water treatment plant was built in 2000. While the WTP is mostly in good working order, some of the plant's components are nearing or have exceeded their useful life. These components include the rapid sand filter, clearwell, high service pumps, alum and polymer system feeds, and microsand recycle system.
- **Demand Projections** – The Water Master Plan and BLCS forecasted future demand using population-based projection models. Potential population growth rates were calculated from US Census data and the City's 2016 Comprehensive Plan and ranged from 0.39% to 1.58% per year. Based on these projections, the studies concluded that the demand would exceed capacity of the WTP by early 2020. However, the actual growth rate has been well below the assumed rates; West Plains currently has 12,304 people with only 2.5% growth since 2010, which corresponds to an average annual growth rate of 0.25%.
- **Storage and Low-Pressure Zones** – The City currently has five storage tanks and one elevated tower. Combined, these tanks provide approximately 6,000,000 gallons of storage but can only use 2,000,000 gallons while maintaining water system pressure. This lack of storage causes the high service pumps to run on a near continuous basis, shortening their useful life and increasing the risk of a service failure. It also impacts firefighting capacity, particularly during the summer months. Finally, several of the elevated tanks have aging components that could impact potable water supply and quality if they fail.
- **Raw Water Supply Quality and Wells** – Groundwater supplies are considered to be "under the direct influence of surface water" due to the karst topography of the area in and around West Plains. This influence can lead to turbidity issues may occur during high rain events and reduced production during drought events. Many of the well houses and control panels are also in disrepair require replacement.

## 4. Community Outreach - Element 3

Element 3 of EPA's Framework requires municipalities to develop a process that opens and maintains channels of communication with relevant community stakeholders in the planning process and during implementation of the plan. The City strives to educate customers and incorporate feedback in all infrastructure planning activities. Each of the City's previous master and facility planning activities described in Section 3 included various opportunities for staff and community members to interact and gather public input, characterize community needs and concerns, and identify likely infrastructure solutions.

The City primarily used feedback from these previous outreach and planning efforts to develop the initial plan priorities, and relied on direct input from the Council to guide and affirm the final plan and project schedules. Because members of the Council are elected by the public, their input and priorities reflect the priorities of the communities they serve and are sufficient for the planning level prioritization and scheduling efforts needed for the initial IMP. In addition to these Council outreach efforts, the City engaged residents with a factsheet to explain the planning process and met with MDNR staff to inform them of the plan and likely outcomes.

In the context of EPA's integrated planning framework, community outreach should be an ongoing process that informs goals and outcomes over time. Therefore, the City plans to more deeply engage the broader community during future iterations of the IMP.

### 4.1 Council Briefings

The City met with the Council several times throughout the development of the IMP so that they were informed and could provide input into the planning process. Those meetings included the following:

- **January 18, 2021** – During this meeting, the City provided updates on the previous infrastructure planning efforts and discussed how they would be incorporated into the final IMP. The City presented with MPUA on the integrated planning process and the benefits of developing a long-term capital improvement plan incorporating drinking water, stormwater, and wastewater improvements. MPUA discussed that the City's IMP would be funded through a planning and technical assistance grant. The presentation provided information on the benefits of going through the integrated planning process including the structure of communication and coordination with the MDNR and EPA.
- **March 22, 2021** – The City, HDR, and MPUA met to discuss the City's IMP Vision Framework (Attachment A). The vision statement was provided to the City Council for comment and approval.
- **July 12, 2021** – During a Council work session, HDR provided a presentation on the approved vision statement for the IMP and discussed the project approach. Funding options and potential capital improvement timelines were also discussed.
- **September 18, 2021** – This Council meeting included an update on IMP progress MDNR discussions. HDR presented the draft 30-year project schedule and discussed new federal funding alternatives that may be available to mitigate rate increases.
- **February 16, 2022** – The City and HDR presented the final IMP to the Council for their review and approval. The Council approved finalization and moving forward with the IMP.

## 4.2 Communication with Residents

Outreach efforts with community residents focused on preparing and providing relevant information to educate the community at large. The City prepared and distributed a project factsheet to introduce the IMP, share the desired outcomes, and provide opportunities for the public to get involved. The factsheet was highlighted on Ozark Radio news<sup>12</sup> on November 3, 2021.

Additional communication with the community will occur in coordination with future capital planning efforts. In the near term, the City will emphasize community engagement through a formal stakeholder process will occur in 2022 – 2024 as wastewater infrastructure projects and financial strategies are developed.

## 4.3 Regulatory Briefings

The City met with state regulatory staff twice during the planning process to inform MDNR of the City's priorities and confirm that anticipated IMP outcomes were consistent with the State's regulatory and compliance objectives.

- **August 17, 2021** – The City, HDR, and MPUA met with MDNR to describe the City's needs and anticipated infrastructure improvement costs. A representative from each of MDNR's Water Protection Program section was in attendance during the meeting, including permits, compliance and enforcement, Financial Assistance Center, water quality, and engineering, as well as the Director of the program. MDNR recognized that this IMP process is a voluntary process and commended the City for taking a proactive approach to develop a long-term capital investment plan integrating drinking water, wastewater, and stormwater investments. Those in attendance expressed support for plan development and offered constructive feedback to optimize plan development.
- **March 8, 2022** – The City, HDR, and MPUA met with MDNR to discuss the final 30-year IMP and 5-year Action Plan. MDNR concurred with the City's plan and agreed that they would use it to inform future wastewater, drinking water and stormwater regulatory decisions. MDNR also acknowledged that the IMP would likely need to be revised in the future to address new and evolving issues and agreed to work with the City to coordinate on those issues.

Going forward, the City will continue to coordinate with MDNR to provide progress updates, periodically review anticipated infrastructure needs and regulatory requirements, and reflect IMP project schedules in any regulatory compliance documents.

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<sup>12</sup> <https://www.ozarkradionews.com/local-news/west-plains-public-works-department-developing-integrated-plan>

## 5. Evaluate Alternative Solutions – Element 4

Element 4 of EPA’s Framework includes the identification, evaluation, and selection of alternatives and implementation schedules for system improvements. As discussed previously, the City worked to identify potential wastewater, stormwater, and drinking water infrastructure improvements and preliminary cost estimates during the individual facility and master planning efforts discussed in Section 3. Since those plans were developed, the City has identified additional investments that will be needed to address evolving regulatory issues in the wastewater and drinking water systems. The integrated planning process provides a framework to holistically evaluate these individual system needs and identify efficiencies, optimization opportunities, and additional planning studies that the City can pursue to make necessary capital investments while lowering compliance costs over the next thirty years.

As the IMP is implemented over time, the City will continue to monitor and evaluate their system needs and modify future implementation actions consistent with EPA Elements 5 and 6, if necessary. A summary of the City’s initial planned solutions are presented below. Planning level cost estimates are detailed in **Appendix A**.

### 5.1 Wastewater System Improvements

Wastewater system investments identified in the IMP include new facility upgrade and planning costs identified in the 2021 WWTP Evaluation, new collection system improvement costs and studies recommended in the 2021 I/I Evaluation, and existing system and program costs that the City will incur as they continue to administer their existing sewer programs. A summary of these costs is described in the sections that follow.

#### 5.1.1 New WWTP Investments

In the 2021 WWTP Evaluation, the City divided the facility capital improvements into two phases. The recommended capital improvements for Phase 1 are focused on improving the hydraulic capacity throughout the system, incorporating blending, adding capacity to the disinfection system, and enhancing nutrient removal to address future total nitrogen and total phosphorus effluent limits. Phase 2 included improvements to optimize operations, including grit removal, aerobic digestion, and sludge dewatering. The probable costs for Phase 1 and Phase 2 were \$27.6 million and \$15.1 million, respectively (Table 1).

To mitigate the potential rate impacts associated with implementing these two large improvement projects in succession, the City developed a preliminary alternative phasing schedule in the IMP by splitting Phase 1 into Phase 1A (\$17.8 million) and Phase 1B (\$6.8 million). Phase 1A addresses near-term concerns including capacity, hydraulics, and wet weather flows. Phase 1B improvements focus on secondary treatment improvements addressing anticipated nutrient removal. In this Phase 1 B scenario, secondary treatment improvements would be limited to modifications to the existing oxidation basin in lieu of creating additional basin volume to meet previously-forecasted flow demands from the drinking water system. To facilitate improvements to the oxidation ditch during construction, the existing peak flow clarifier (PFC) would be modified to serve as an interim aeration basin. Temporary pumping or gravity piping would be required to transfer flows from the PFC to the selector basins and downstream of the PFC to convey flow to the clarifier splitter box.

**Table 1. Cost Summary for the Phased WWTP Upgrades Included in the IMP.**

Phase	Sub-phase	Cost Component	2021 WWTP Evaluation Alternative (in 2021 \$)	IMP Alternative (in 2021 \$)
1	A	Capital	\$23,500,000	\$15,240,000
		Engineering	\$4,100,000	\$2,560,000
	B	Capital	---	\$5,260,000
		Engineering	---	\$1,540,000
2	---	Capital	\$12,800,000	\$12,800,000
	---	Engineering	\$2,300,000	\$2,300,000
<b>Total</b>			<b>\$42,700,000</b>	<b>\$39,700,000</b>

Results of the phasing re-evaluation lower potential upgrade costs from \$42.7 million to \$39.7 million (in 2021 dollars). For planning purposes, the IMP assumes that Phase 1A, 1B, and 2 improvements will be initiated in 2024, 2029, and 2033. Necessary facility planning studies will occur prior to these dates.

### 5.1.2 New Collection System Investments

Based on recommendations provided in the 2021 I/I Evaluation report, the City is conducting a detailed sanitary sewer evaluation study (SSES) over the next four years to fill identified data gaps, better prioritize basin improvements, and more accurately estimate future system renewal costs (Table 2). In the interim, the City has included planning level cost estimates in the current IMP to serve as placeholders for future improvement activities. These activities include emergency repairs, routine system rehabilitation and renewal, and near-term system expansion efforts. In particular, initial efforts will likely focus on renewing assets in collection basins #1 and #2 to address the most significant I/I areas. These collection system estimates will be refined based on results of the SSES in future iterations of the IMP.

**Table 2. Summary of New Collection System Investment Costs and Implementation Schedules.**

New Collection System Investment	Estimated Cost (in 2021 \$)	Anticipated Investment Years
Sanitary Sewer Evaluation Study	\$1,710,000	2021 – 2024
Emergency Repairs	\$1,415,000	2021 – 2025
System Rehabilitation	\$7,000,000	2026 – 2050
System Expansion	\$600,000	2022, 2024, and 2026

### 5.1.3 Existing Program Costs

In addition to the new costs summarized above, the IMP includes costs needed to develop planning studies, and continue existing sewer operations, maintenance, and administrative activities over the 30-year planning period. The costs and timing of activities included in the IMP reflect the City’s current understanding of system needs and may be revised in future IMP updates. Specific planning level costs for these activities are summarized in Appendix A.

## 5.2 Stormwater System Improvements

The 2012 Stormwater Study identified approximately \$8.2 million (in 2012 dollars) of capital improvements that could be pursued to create detention basins, rehabilitate conveyance structures, and reduce erosion across the City. However, the City does not have a funding mechanism in place to pursue these improvements so costs were not included in the 30-year plan. For purposes of the IMP, the City will continue to seek grant opportunities that could be used to fund these projects in the future.

The IMP does include approximately \$115,000 (in 2021 dollars) per year to fund personnel and operations activities needed to continue implementing the MS4 permit program. Specific planning level costs for the stormwater system are summarized in Appendix A.1.

### 5.3 Drinking Water System Improvements

Drinking water system investments identified in the IMP include new facility upgrade and planning costs identified in the 2019 Water Master Plan for the City’s drinking water system, 2020 BCLS report and existing system and program costs that the City will incur as they continue to administer their existing drinking water programs. A summary of these costs is described in the sections that follow.

#### 5.3.1 New Capital Investments

The Water Master Plan and the BCLS report identified several capital investments to address capacity needs within the system. New wells and an additional Water Treatment Plant were recommended to increase the drinking water treatment capacity to 7.4 MGD. For planning purposes, the capital costs associated with the identified improvements to install new wells and increase WTP capacity have been retained and included in this IMP (Table 3). However, the City intends to reevaluate the anticipated growth and flow projections before moving forward with the substantial capital investment required to build a new WTP, wells, and enhanced storage facilities.

The BCLS identified additional capital improvements necessary to improve aging infrastructure including the sequencing of water tower improvements. Phase 1 of the storage enhancements includes the construction of two new tanks with total storage capacity of 2.2 million gallons. Phase 2 of the storage enhancements increases the total storage for the City to 3.3 million gallons. The additional water storage will improve water pressure, enhance fire flow protection, and provide additional capacity for future growth.

**Table 3. Summary of New Drinking Water System Capital Investments Included in the IMP.**

<b>New Drinking Water System Investment</b>	<b>Estimated Capital Cost (in 2021 \$)</b>	<b>Anticipated Investment Years</b>
Storage Phase 1	\$2,500,000	2022 - 2024
Storage Phase 2	\$8,200,000	2028 - 2030
New Water Treatment Plant	\$33,000,000	2034 – 2038
New Wells	\$5,250,000	2030 – 2036

The first 5-year action plan reflects additional flow studies, groundwater exploration studies, and water storage analysis to better define the City’s water needs. Results of the studies may change the recommended capital improvements to maintain and plan for future water capacity needs. If necessary, new recommendations and estimated capital costs will be incorporated during future updates to the IMP.

#### 5.3.2 Investments to Address New Regulatory Requirements

As outlined in Section 3.1.3, there are new drinking water regulatory requirements at both the State and Federal levels that the City must address in the near-term. In particular, the LCRR was promulgated into 40 CFR 141 along with the development of the LCRI to support the overarching goal of proactively removing LSLs and protecting public health. The LCRI are set to be promulgated in Summer of 2024 ahead of the LCRR initial compliance date of October 16, 2024, to submit the first service line inventory.

West Plains will prioritize the development of a comprehensive inventory, including both the municipal-owned and customer-owned portion of the service line. A complete inventory will include a location identifier for each service line and will define the material based on the required categories:

- “Lead” – service line is made of lead.
- “Galvanized Requiring Replacement” – any galvanized pipe that was at one time or currently downstream of a lead service line or a lead-status unknown service line.
- “Non-lead” – service line is determined through an evidence-based record, method, or technique not to be lead or galvanized requiring replacement.
- “Unknown” – All requirements for LSLs are applied until confirmed as non-lead.

The service line inventory is required to be made publicly available with directions on how to obtain the inventory posted to each Consumer Confidence Report. The current LCRR requires inventories to be updated annually or as service lines are replaced and unknowns are identified.

At this time, EPA has not finalized LCRR implementation guidance so compliance costs for utilities across the country is still unclear. For planning purposes, the City has estimated the cost for the inventory to be \$1 million over the next two years (Table 4). Replacement costs are estimated at \$6.8 million over the remaining planning period. These costs will be revised during future IMP updates based on implementation guidance received from regulatory agencies, the prevalence of lead service lines in the system, and availability of federal and state subsidization programs to support compliance.

**Table 4. Drinking Water System Investments to Address New Regulatory Requirements.**

<b>New Drinking Water System Investment</b>	<b>Estimated Capital Cost (in 2021 \$)</b>	<b>Anticipated Investment Years</b>
Lead Service Line Inventory	\$1,000,000	2022 – 2024
Lead Service Line Replacement	\$6,755,000	2024 – 2050
Hydrant Testing Program	\$1,800,000	2022 – 2050
Valve Inspection Program	\$1,025,000	2022 - 2050

In addition to the LCRR, the City must comply with the 2019 Water Safety and Security Act. This statute requires public drinking water systems to develop an annual hydrant testing program and maintain a valve inspection program. For planning purposes, the City has assumed that the combined cost of compliance for these programs will be approximately \$3 million over the IMP planning period (Table 4). These costs will be revised during future IMP updates to reflect actual costs of the State and Federal mandates.

### 5.3.3 Existing Drinking Water Program Costs

As stated above, the IMP includes costs needed to develop planning studies, and continue existing drinking water operations, maintenance, and administrative activities over the 30-year planning period. The costs and timing of activities included in the IMP reflect the City’s current understanding of system needs and may be revised in future IMP updates. Specific planning level costs for these activities are summarized in **Appendix A**.

## 5.4 Anticipated Costs and Schedule

Consistent with the goals identified in Element 1, the IMP prioritizes infrastructure improvements outlined in the previous sections to achieve regulatory requirements, meet immediate customer demands and service needs, and repair or replace aging infrastructure most cost-effectively for the community. In general, the City’s implementation approach focuses on restoring critical water storage needs, initiating Phase 1A WWTP upgrades, addressing new drinking water regulatory requirements, and conducting additional planning studies in the first five years. Beyond five years, the IMP assumes that significant WWTP and WTP upgrade projects will be staggered to maintain community affordability. These assumptions will

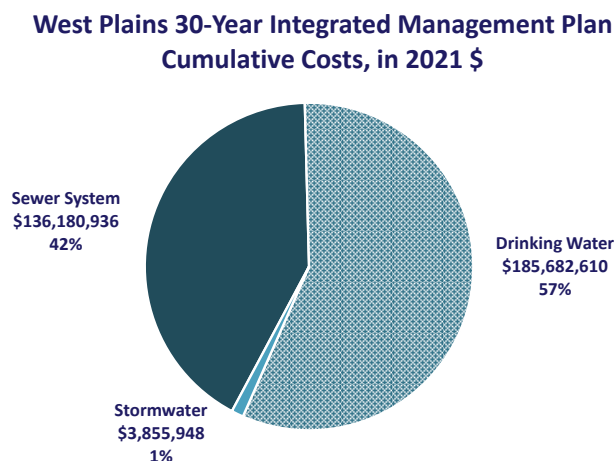


continue to be reevaluated as the City continues to gather information, refine project needs, and identify optimal funding strategies. This scheduling approach is consistent with EPA’s Framework because it prioritizes the most critical public health and environmental issues first, while continuing to make steady progress towards meeting CWA requirements service needs over time.

A summary of the City’s initial IMP implementation schedule, anticipated costs, funding strategies, and estimated billing impacts are included in the sections that follow.

### 5.4.1 30-Year IMP Costs

The total projected 30-year cost of the IMP is approximately \$325 million (Figure 2, in 2021 dollars). Drinking water system investments are the largest planned expenditure over that time (\$186 million) and make up approximately 57% of the total cost. Approximately 60% (\$110 million) of those drinking water costs satisfy routine operation, maintenance, and equipment replacement needs anticipated over the 30-year planning period. The remaining costs include the new investments to implement storage, regulatory compliance, source water quality, treatment upgrades, and planning studies described in Section 5.3.



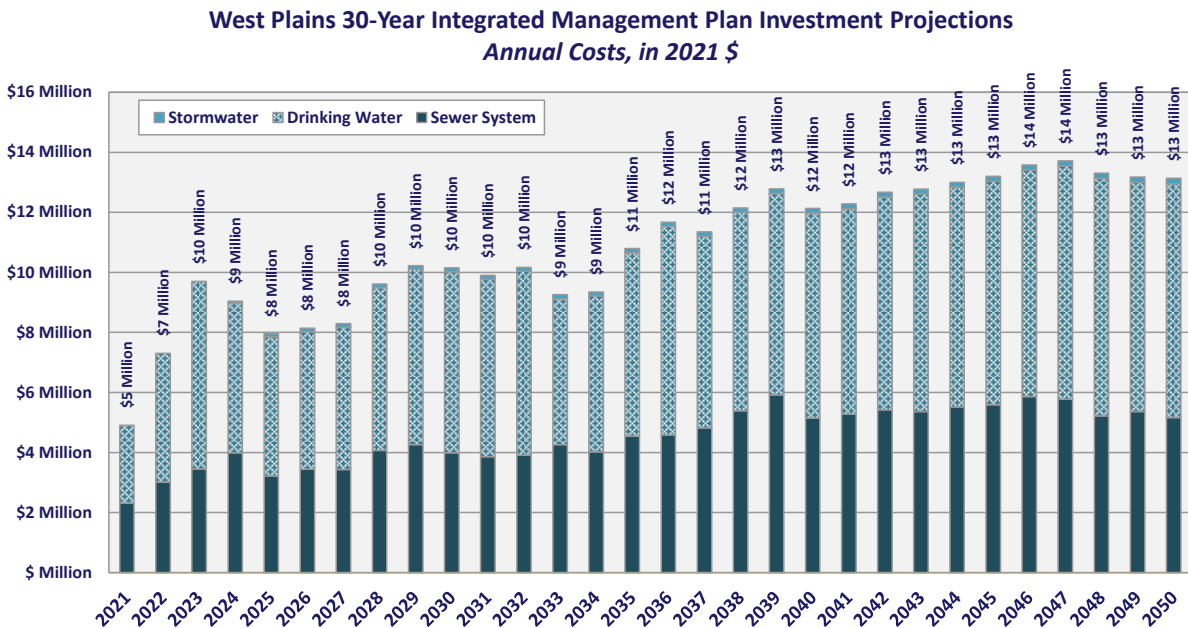
**Figure 2. Summary of total 30-year IMP costs.**

Planned sewer and stormwater management system investments make up the remaining 43% of the total 30-year cost. Similar to the drinking water system, approximately 60% (\$86 million) of the planned costs address routine operation, maintenance, and equipment replacement needs anticipated over the 30-year planning period. New investments include costs to implement phased WWTP upgrades to improve wet weather management and comply with anticipated regulatory drivers, complete the SSES study, improve data management and asset tracking procedures, and repair and replace collection system assets over time.

### 5.4.2 Anticipated Cost Increases and Billing Impacts

Although IMP investments were prioritized to most cost-effectively meet the goals identified in Element 1, the City will still have to significantly increase annual wastewater and drinking water spending to fund near term capital projects and build the financial capacity to prepare for implementing future projects that are currently included in the IMP. Based on the current planning scenario, the City anticipates that total annual spending will increase from approximately \$5 million in 2021 to approximately \$13 million in 2050 (Figure 3, in 2021 dollars). Project funding assumptions for the planning scenario are outlined in Section 5.4.3. Annual spending is projected to nearly double within the first three years as the City implements Phase 1

of the water storage project, conducts service line inventories to comply with new regulatory requirements, and implements critical repairs in the sewer collection system. After three years, annual spending decreases for several years before increasing incrementally over the remaining planning period as the City implements significant new storage, wastewater treatment, wastewater collection, and drinking water treatment capital projects.



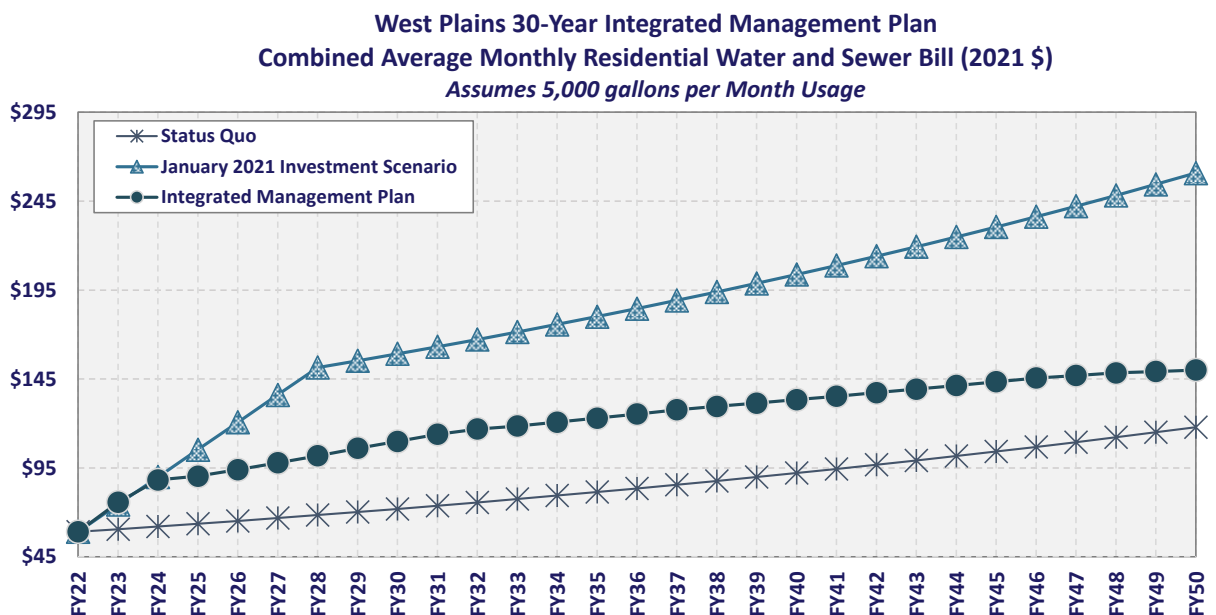
**Figure 3. Estimated Annual Wastewater, Drinking Water, and Stormwater Costs for the IMP<sup>13</sup>.**

Before finalizing the IMP, the City’s Administration and Finance Department evaluated several improvement scenarios to understand how increased costs would impact residential customers bills and the City’s ability to deliver necessary sewer and drinking water services (Figure 4). The scenarios included maintaining the status quo, continuing with the initial investment scenario identified in January 2021, and implementing the IMP. Results from the City’s evaluation are summarized below.

- Status Quo Scenario** – In this scenario, the City assumed that none of the new sewer, drinking water, and stormwater program investments identified in this report would be implemented and existing programs would continue to increase at a rate consistent with the national utility average (approximately 3% before inflation) over the 30-year period. Under this scenario, the average combined residential monthly bill would necessarily increase from approximately \$59 to \$118 (in 2021 dollars) over the 30 years. However, the City would not be able to fund critical projects needed to comply with state and federal regulations and would likely have significant service failures (inadequate drinking water storage, drinking water delivery, waste conveyance, and waste treatment) that put public health, safety, and the environment at risk. For these reasons, the City concluded that the status quo is not viable.

<sup>13</sup> Funding and finance assumptions are provided in Section 5.4.3.

- January 2021 Investment Scenario** – As an alternative to the status quo, the City evaluated the original improvement proposal that was presented at the January 2021 Council meeting (see Section 1). This alternative included implementing nearly all of the major capital improvements identified in this report within a 10-year period. To fund this scenario, average bills would increase by approximately 150% over the first six years and then by approximately 3% per year (before inflation) in the following years. This scenario would allow the City to meet more quickly all regulatory requirements, provide all necessary services, and protect public health, safety, and the environment. However, the necessary increase and rate of increase in average month bills to support that level of investment would be unsustainable for customers. For these reasons, the City concluded that the January 2021 Investment Scenario is not viable.
- IMP Implementation Scenario** – Despite the anticipated increase in annual costs (Figure 4) that will result from implementing the IMP, this scenario allows the City to prioritize and implement cost-effective sewer and drinking water improvements while collecting additional information and data to inform future infrastructure needs. Under this scenario, the City will maintain regulatory compliance and meet near-term customer service needs while mitigating billing impacts. The City anticipates that although average monthly residential bills will have to incrementally increase to fund projects identified in this plan, the rate of increase will be moderate and result in significantly lower bills overall when compared to the January 2021 Scenario. Under the IMP, average monthly bills are projected to increase from \$59 to approximately \$145 (in 2021 dollars) at the end of the 30-year planning period. The IMP Implementation Scenario is also preferable to the Status Quo Scenario because it allows the City to fund necessary infrastructure improvements and serve customer needs while only requiring a relatively small increase in average bills by 2050 (\$118 vs. \$145, in 2021 dollars). For these reasons, the City has determined that the IMP Implementation Scenario is the most fiscally and environmentally sustainable alternative going forward.



**Figure 4. Comparison of Projected Average Monthly Residential Water and Wastewater Bills for Three Infrastructure Investment Scenarios Evaluated for the IMP.**

EPA's Framework recommends that integrated plans provide a financial strategy and capability assessment that demonstrates system improvements can be sufficiently funded over time. In doing so, both EPA<sup>14</sup> and MDNR<sup>15</sup> understand the importance of maintaining ratepayer affordability and recognize that there is no "one-size-fits-all" approach for determining what is affordable in every community. Over the past several years, EPA has been working to modify national Financial Capability Assessment (FCA) guidance to provide utilities with a new framework to evaluate affordability but have not yet finalized their recommendations.

EPA guidance<sup>16</sup> has generally characterized affordability relative to the community's median household income (MHI). Specific to sewer rates, EPA considers financial impacts to be low if average bills are less than 1% of community MHI, mid-range if average bills are between 1% and 2% of MHI, and high if they are greater than 2% of MHI. Guidance for evaluating the residential affordability of drinking water bills is limited but 2.5% of MHI is generally interpreted as the threshold for measuring high impacts.

Based on this guidance, the combined wastewater and drinking water residential bill threshold for high financial impacts is approximately 4.5% of MHI. In the City, this equates to approximately \$122 per month. The projected bills under the IMP Implementation Scenario remain under \$122 through the first half of the planning period. It is important to note that these billing impacts are based on planning level costs and will likely change as the City gathers additional information and innovates to find cost-effective solutions during IMP implementation. Additionally, these forecasts do not consider the impacts of new grant and loan programs or changes in socioeconomic conditions and community growth and development that may influence future project costs and affordability projections. For these reasons, the City understands that it will be important to reevaluate and refine projected costs and billing impacts every five years.

#### 5.4.3 Funding Considerations

The City currently intends to fund major capital improvement projects included in the IMP through a combination of increased user rates, private financing, and low-interest loans available through MDNR's State Revolving Fund (SRF). The City also intends to pursue grant opportunities as they become available. Notable IMP funding and financing assumptions are summarized below. These assumptions be reviewed and revised over time, as necessary.

- **Private Loans** – The IMP assumes the City will fund Phase 1 of the drinking water storage project through a private loan. The cost forecast assumes an interest rate of 3.5% over a term of 10 years.
- **SRF Loans** – The IMP assumes that the City will fund the Phase 2 storage project, all phases of the WWTP upgrade, and the WTP upgrade through low-interest SRF loans. MDNR's SRF program features a fixed-rate, 20-year loan with a standard interest rate that is 30% of the municipal market rate. The IMP currently assumes a rate of 1.0%, an administration fee of 0.50%, and a 20-year term for all projects. These assumptions will be reevaluated and adjusted as market rates change over time. To qualify for SRF loans, applicants must demonstrate they have adequate bonding capacity and authority in addition to the necessary engineering plans. The IMP capital improvement schedule assumes the City will secure the necessary bonding capacity and finalize facility planning efforts prior to applying for an SRF loan for Phase 1A of the WWTP by March 1, 2025.

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<sup>14</sup> Kopocis, K., and C. Giles. 2014. Financial Capability Assessment Framework for Municipal Clean Water Act Requirements. Office of Enforcement and Compliance Assurance. Washington, D.C.

<sup>15</sup> MDNR. 2016. Missouri Integrated Planning Framework. Water Protection Program. Jefferson City, Missouri.

<sup>16</sup> Davies, T. 1995. Economic Guidance for Water Quality Standards Workbook. Office of Science and Technology. Washington, DC. EPA-823-B-95-002.

## 6. Adaptive Management and Continuous Improvement (Element 5 & 6):

The nature of creating a substantiable capital improvement plan requires monitoring, completing system studies, evaluating projects and practices as work proceeds (Element 5), and applying new data and information to adapt or revise plans over time (Element 6).

The IMP projects planned presented in the previous sections reflects the City's understanding of infrastructure and regulatory priorities over the next 30 years with respect to the information currently available. However, priorities may change as additional needs or regulatory requirements are identified over time. Therefore, the forecasted timing and cost of wastewater, drinking water, and stormwater program improvements currently included in the plan should be considered planning level estimates that must be reevaluated periodically.

Consistent with Elements 4, 5 and 6, the City anticipates implementing the IMP in a phased approach to provide investment certainty over the next 5 years but allow flexibility to respond to new regulatory or non-regulatory needs that arise over the 30-year planning horizon. To implement early actions, the City's first 5-Year IMP Action Plan is focused on conducting additional planning and assessment studies to better characterize wastewater treatment and drinking water capacity needs. Specifically, the City will pursue the following actions as part of the first 5-Year Action Plan:

- **Wastewater System**
  - Initiate facility planning efforts for Phase 1A WWTP improvements
  - Finalize SSES study
  - Continue existing programs
  
- **Drinking Water System**
  - Initiate detailed planning effort for Phase 1 storage enhancements
  - Update flow analysis and demand projections
  - Complete a groundwater explanation study
  - Initiate valve and hydrant testing programs
  - Initiate service line inventories
  - Continue existing programs
  
- **Stormwater System**
  - Investigate funding opportunities
  - Continue existing programs

The City will pursue these actions to the extent possible but acknowledge that funding, staff availability, and other resource constraints or unanticipated needs may impede complete implementation of the action plan. The City will provide MDNR with an annual update detailing progress on the 5-year Action Plan. Every five years, the City will submit a revised IMP and new 5-year Action Plan to MDNR with their NPDES permit renewal. Each revision will incorporate additional information and knowledge gained within the previous five years to set anticipated actions and measurable goals. Additionally, each subsequent action plan will use the added information to revise IMP projections with respect to evolving regulatory requirements and program needs.



