

Community Priorities Drive Smart One Water Long-Range Investment Decisions

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In 2015, the City of Columbia, Missouri, faced potential wet-weather enforcement, National Pollutant Discharge Elimination System permitting, and total maximum daily load (TMDL) issues with a potential cost of hundreds of millions of dollars over the next 15 years. Significant and unaffordable rate increases would have been required to meet these new compliance costs and address existing regulatory and infrastructure challenges.

To mitigate impacts from these regulatory drivers and create a thoughtful long-term investment strategy, the City partnered with HDR to develop an Integrated Management Plan (IMP) to balance and prioritize wastewater and stormwater program investments over the next 20 years. The planning effort focused on developing an investment strategy to affordably meet funding needs for the wastewater collection, wastewater treatment, and stormwater management programs.

The Columbia IMP shows how municipalities can use integrated planning to successfully mitigate near-term rate impacts of impending regulatory drivers while affordably prioritizing and scheduling long-term infrastructure improvements. With their approach, the City identified and scheduled approximately \$900 million of capital improvements along with operational enhancements over the next 20 years. In addition, gaps in system understanding were identified and will be studied to inform IMP updates and future investments using an adaptive management approach.

In January 2011, the Missouri Department of Natural Resources initiated enforcement negotiations with the City for sanitary sewer overflows. During this time frame, the City also faced a biological TMDL, which identified urban stormwater as a significant pollution source. With these two impactful regulatory drivers alone, the City realized that program costs would become unaffordable with typical implementation requirements. Additionally, the City understood that future regulatory drivers and service demands would continue to impact program decisions for the next several decades.

In 2012, the Environmental Protection Agency released the Integrated Municipal Stormwater and Wastewater Planning Approach Framework to provide communities more flexibility to make cost-effective infrastructure improvements. This framework outlines a process for municipalities to meet Clean Water Act objectives by appropriately prioritizing and scheduling improvements according to need and financial capability. When EPA's framework was issued, the City recognized that the IMP provided a means to address existing and future regulatory requirements while continuing to meet system needs.

The team identified four goals for the IMP:

- Target five years of regulatory certainty to allow development of a long-term asset management program.
- Consider financial impacts on all ratepayers, and specifically disadvantaged communities.
- Obtain input from a wide variety of stakeholders.
- Develop recommendations that have multiple community benefits.

In its framework, EPA defined principles and elements that every plan must follow but recognized that integrated plans should be appropriately sized to the municipality. The team tailored a community-driven approach that aligns with EPA's framework and builds on the City's previous planning efforts. With this approach, the team prioritized critical system needs based on anticipated environmental, social, and economic benefits, and scheduled them to allow for affordable implementation over the next 20 years. A brief summary of the IMP approach is included below.

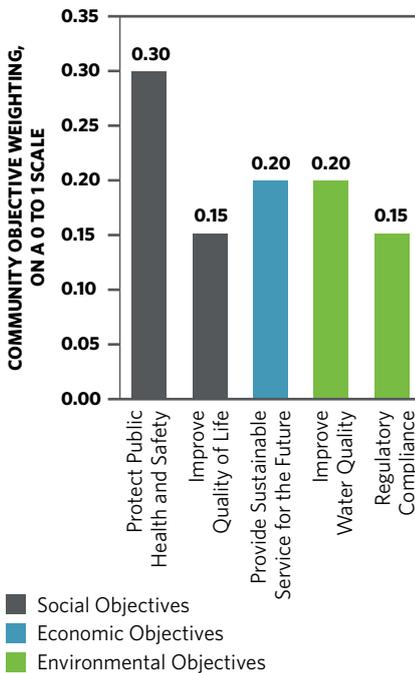


Columbia IMP Project Approach.

- **Build the Vision.** The City hosted a two-day visioning workshop with City staff, leadership, and local government agency representatives to discuss existing and future challenges, goals and objectives of the IMP, and potential strategies to meet those goals. This process established the following vision for the IMP:

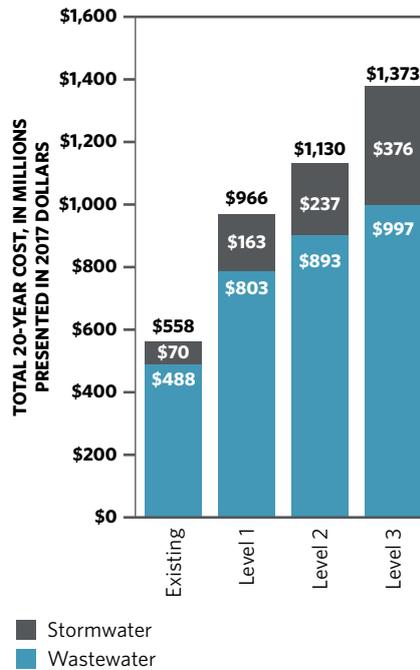
The stormwater and wastewater Integrated Management Plan is a community-driven, affordable infrastructure plan that enhances human health and safety, water quality, economic vitality, and environmental resources by leveraging existing assets and implementing innovative solutions.

- Evaluate Existing System Performance.** The team evaluated surface water quality and wastewater and stormwater program data to develop a comprehensive understanding of existing conditions. This review identified important programmatic needs and data gaps that must be addressed to effectively meet long-term environmental and regulatory goals. In addition, the team conducted a comprehensive water quality assessment, characterized current conditions, and established water quality priorities.
- Develop a Community Outreach Program.** Community input directly informed development of the IMP alternatives. The team implemented a targeted program to obtain input, review alternatives, discuss affordability, and identify decision criteria. The team used the triple-bottom-line approach to characterize outreach results and develop weighted objectives that captured the community's social, economic, and environmental goals.



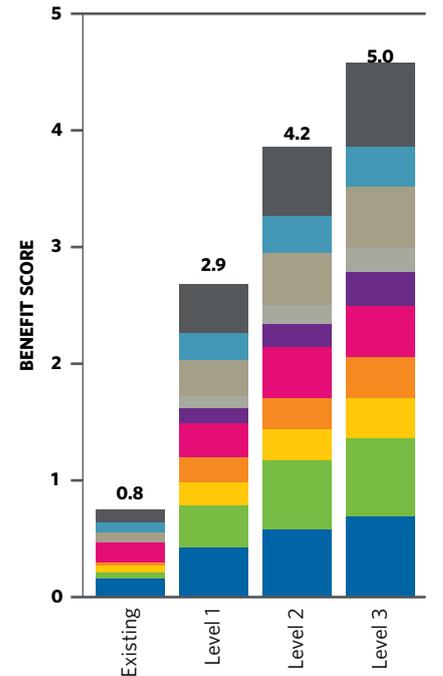
IMP community outreach provided social, environmental, and economic priorities and weightings for informed decision-making.

- Evaluate Alternatives and Develop an Implementation Schedule.** The alternatives analysis process was used to characterize a range of potential costs over the planning period. The team defined four funding levels to guide the evaluation: 1) continue the existing funding level; 2) increase funding to provide the minimum level of service and meet existing regulations; 3) increase funding to exceed the minimum level of service and meet existing regulations more proactively, and 4) increase funding to address all needs and meet all forecasted regulations. Under these scenarios, projected costs ranged between \$966 million and \$1.37 billion in total wastewater and stormwater expenditures over the 20-year planning horizon (in 2016 dollars).



The alternatives analysis identified four potential funding levels to address system needs, regulatory drivers, and customer expectations.

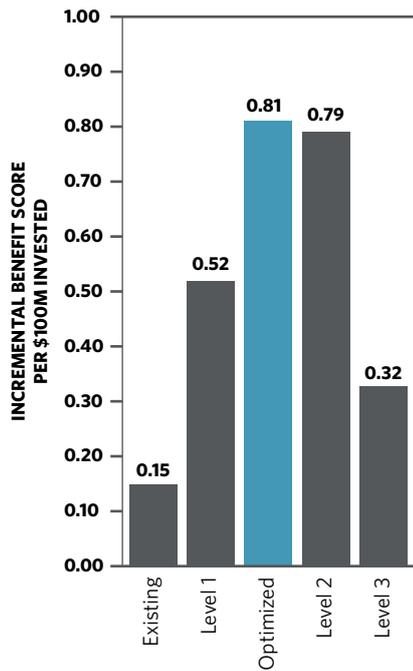
To determine which funding level alternative appropriately balanced costs with community objectives, the team applied a multiple criteria decision analysis (MCDA) tool and calculated a benefit score (on a 0 to 5 scale) to estimate the value each alternative would produce based on priorities established through the outreach program.



- Meet Clean Water Act Requirements
- Protect Important Regional Waterbodies
- Protect or Improve Water Quality in City Streams
- Provide Adequate Services to Growing Areas
- Improve Services to Underserved and Redeveloping Areas
- Renew Systems Beyond Effective Life
- Reduce Potential for Property Damage
- Provide Community-Wide Benefits
- Reduce Safety Hazards from System Failure
- Reduce Pathogen Exposure

Columbia's IMP funding level alternatives deliver varying degrees of community benefits.

The team recognized that although Level 2 funding had the highest benefit-to-cost ratio, an optimized alternative could be developed by combining projects that provided the best value from among the four funding levels. For example, many of the Level 1 wastewater projects and Level 2 stormwater projects produced the highest benefits relative to the other funding levels. By combining these projects into a new optimized alternative, marginally greater benefit than level 2 could be achieved while costing \$114 million less over the 20-year planning period.



The optimized suite of IMP alternatives produces the greatest overall benefit to the community.

The MCDA quantified costs and benefits but did not consider affordability. Before committing to implementation of the optimized alternative, the team forecasted affordability impacts by coupling an innovative qualitative characterization of socioeconomic stress with a quantitative assessment of future billing impacts

across census tracts. The socioeconomic stress evaluation included an assessment of hardship indicators such as home ownership and costs, health insurance coverage, income and poverty thresholds, and public assistance rates. Using these indicators, the team identified census tracts with high potentials for economic stress. The team then evaluated the future billing impacts in these stressed neighborhoods to better understand and forecast potential affordability impacts over time. Following this review, this City concluded that the optimized alternative will be affordable.

- Implement and Measure Success.**
 The optimized alternative reflects the City's understanding of infrastructure and regulatory priorities with respect to the information currently available. However, data gaps and uncertainties identified early in the IMP process must be more accurately characterized before the City can commit to long-term implementation. Therefore, the City will pursue a 5-year action plan focused on collecting critical data needed to more precisely forecast future needs while continuing to implement currently identified projects. After five years, the City will use the new information to revise IMP projections.

The IMP was completed in early 2018 and was approved by the Columbia City Council on December 3, 2018 (www.como.gov/utilities/sewer/imp/). The IMP garnered strong support by the Council and the community by providing confidence in the City's long-range investment to address community priorities in a balanced and affordable strategy.

Since Council adoption, the Missouri Department of Natural Resources has provided written acceptance and support for the plan with commitment to use the IMP to inform future permitting and compliance schedules and administrative agreements. The Columbia IMP provides a strong example of the environmental, regulatory, and financial benefits that utility managers can achieve through application of EPA's integrated planning framework. Through this process, the City has developed a prioritized and balanced One Water infrastructure investment strategy that addresses Clean Water Act requirements, achieves community objectives, provides long-term regulatory certainty, and meets programmatic and capital sewer and stormwater needs over the next 20 years.

| SYSTEM | WASTEWATER TREATMENT | WASTEWATER COLLECTION | STORMWATER MANAGEMENT |
|------------------|--|---|--|
| Project Category | Wet Weather Improvements Expanded Nitrification Biological Nutrient Removal Chemical Disinfection Constructed Wetlands Impr. Digester Rehabilitation Digester Capacity Impr. | Wet Weather Program Asset Management System Renewal System Capacity Building Backups Private Common Collectors System Expansion Cleaning Program Pump Station Repair Annual Improvements | SW Planning System Assessment System Renewal Flood Control Stream Erosion Runoff Treatment MS4 Program |
| Level 1 | ✓ ✓ ✓ ✓ ✓ | ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ | ✓ ✓ ✓ ✓ ✓ |
| Level 2 | ✓ | ✓ | ✓ ✓ ✓ ✓ |

Optimized Alternative analysis was conducted for each project category across all sub-objectives.

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