Section 05
Water and Wastewater

Click here to return to TOC

Water and Wastewater

Why Water and Wastewater is Important

Water is at the core of climate change and sustainable development. Quality water is vitally important for socio-economic development, maintaining healthy ecosystems, and for human survival. Water is central to the production and preservation of a wide range of services benefiting people. How we process water is also integrally linked to how emissions intensive that water treatment is. Water related energy use totals 13% of US electricity consumption and has a carbon footprint of at least 290 million metric tons. Meanwhile, wastewater treatment is responsible for 3% of global GHG emissions.

Water is also at the heart of adaptation to climate change. In our the Midwest, climate change will increase the likelihood of drought combined with additional heavy rain events, flooding, and flash flooding. On average across the Wabash River Basin, precipitation is projected to be 3% higher in the 2020s under a high-emissions scenario compared to the 1971-2000 average (FutureWater Indiana). Climate change will also/result in increased stress on our water systems, increase water pollution potential, and place more risk on maintaining safe water resources. Water is an irreplaceable, critically important resource fundamental to the well-being of our communities. Water can only be considered renewable with high quality best water management practices in place.

According to the "*Hoosiers' Health in a Changing Climate: A Report from the Indiana Climate Change Impacts Assessment* ":

> the increased frequency and severity of precipitation, as well as the timing in the spring and winter, considerably increase the risk of flooding, especially in low-lying areas throughout the state. These flood events may be responsible for fatal and non-fatal injuries and waterborne disease. Heavy storms can cause storm drains and sewage pipes to overflow and residential stormwater management systems (e.g., sump pumps) to fail. Contact with stormwater/wastewater has been correlated with increased rates of gastrointestinal illnesses. Dampness in homes, schools and other buildings caused by flooding can increase mold growth and lead to higher rates of asthma and allergies.

According to FloodFactor, 7% of all properties are at risk for flooding. This is approximately 1,500 properties out of 21,330 assessed. By 2050 the number will increase to 1,543 properties due to climate change impacts. (https://floodfactor.com/city/bloomington-indiana/1805860_fsid)

The City of Bloomington Utilities Department (CBU) provides water to all Bloomington residents and businesses and sells water wholesale to nine rural water cooperatives. CBU provides over 2.8 billion gallons of water to 25,299 water customers directly plus most of the remainder of Monroe County through wholesale customers and also serves 22,574 sewer customers and provide stormwater management services for the entire city of Bloomington. In 2018, the water and wastewater sector contributed 1.14% of citywide GHG emissions with water distribution responsible for 5,847 metric tons and wastewater treatment accounting for 8,904 metric tons.

Climate Change Considerations

Climate

This sector impacts climate change through fossil fuel use to generate the electricity required to process and distribute water.

Climate Hazards

Hazards to the water and wastewater system include damage to infrastructure from extreme weather and flooding. Citywide hazards include increased flooding and flash flooding potential.

Water and Wastewater

Equity Considerations

- Low-income neighborhoods frequently suffer more damage from flooding, according to studies by the National Academies of Sciences, Engineering and Medicine (*Framing the Challenge of Urban Flooding in the United States*, 2019). The frequency and magnitude of heavy rain events is expected to increase as a result of a changing climate, making the future flooding impacts for at-risk neighborhoods potentially more acute.
- Disadvantaged communities within cities often have denser populations, more impervious surfaces, and less open/green spaces. These areas can also be prone to flooding and sewer overflows. Stormwater management through the creation of open, green spaces serve to revitalize and promote health within these disadvantaged communities.

Sector Goals

Sector goals are established to both support the City's Climate Action Plan in creating a climate resilient community and to reduce city-wide GHG emissions 25% below 2018 levels by 2030.

Sector goals related to GHG emissions reductions are designed to balance reduction across all sectors and achieve the overall emissions goals set forth for the community. The goals seek to strike a balance between achievability while also reaching for improvement beyond business-as-usual.

As indicated in the introduction, the Climate Action Plan is intended to be a 10 year plan to be updated at the completion of that time. Consequently, the goals and strategies outlined in this section are intended to be achieved by 2030 unless otherwise noted.

Implementation of actions are anticipated to be initiated over 3 phases: phase 1 within 1-3 years, phase 2 within 2-5 years, and phase 3 within 4-8 years of CAP approval.

Goal W 1
Decrease potable water consumption by 3% of 2018 values.

Goal W 2
Maintain source and drinking water quality through climate related challenges.

Goal W 3
Reduce energy use associated with treating and transporting water and wastewater by 10% of 2018 values.

Goal W 4
Mitigate flood hazards and impacts.

Water and Wastewater Targets Supporting Sector Goals

	Potable Water Consumption	Water + Wastewater Process Energy
Today	92 Gallons/day per capita	282 kWh/year per capita
2030 Targets	88 Gallons/day per capita	250 kWh/year per capita

Goal W 1 Decrease potable water consumption by 3% of 2018 values.

Strategy W 1-A:

Promote increased water conservation citywide.

How We'll Measure Progress:
Reported citywide water consumption

Average per residential capita daily water consumption within the city was 96.2 gallons in 2016. The population of Bloomington and the surrounding area is anticipated to increase while water supplies are finite meaning wee have an obligation to use our limited resources responsibly. Prudent water use practices will help ensure that future generations have access to clean and abundant water sources, despite growing populations and the lack of new supplies. Reducing per capita water consumption by 3% will conserve over 38 million gallons annually in the residential sector alone.

Co-Benefits of Strategy:

Reduced Costs

Improved Community Resilience

	Actions	Implementation Phase
W1-A-1	Facilitate reduction of water use by top 20 customers through an opt-in program. Offer free technical resources to large institutions and businesses to identify specific opportunities for employees or customers to conserve water and incorporate water efficiency into internal operations.	1
W1-A-2	Accelerate the installation of low-flow water fixtures in residential homes and expand the program to commercial businesses. Goal: achieve 100 households and 10 businesses upgraded annually.	1
W1-A-3	Develop a technical assistance and incentive program to encourage water conservation behavior and upgrades, such as use of drip irrigation and low-flow toilets.	2
W1-A-4	Implement a policy to require installation of rainwater collection systems and WaterSense water efficient fixtures and appliances at all City facility projects and all projects receiving $50,000 or more in City tax abatement, financing or funding. Provide information and technical assistance to projects as needed.	2
W1-A-5	Expand water conservation programs that focus on outdoor irrigation, which may also support better identification of water-related carbon sequestering opportunities such as using soil amendments, native grasses and proper tree watering.	3
W1-A-6	Expand water conservation outreach and incentive programs for residents and businesses.	3

Strategy W 1-B:

Maintain and update city plans and standards in support water conservation goals.

Reducing water consumption within City of Bloomington facilities supports citywide water conservation goals, provides opportunities to exhibit water conservation techniques, and will create operational cost savings for the City.

How We'll Measure Progress:
Reported citywide water consumption

Co-Benefits of Strategy:

Protected / Enhanced Ecosystems

Improved Community Resilience

	Actions	Implementation Phase
W1-B-1	Evaluate the potential to update the City's Green Building Ordinance to include installation of rainwater collection systems at City facilities for graywater uses, and investigate opportunities for graywater reuse at existing and new City facilities and properties. Implement graywater systems identified capable of reducing energy/water demand in other areas (i.e. watering urban tree canopy to reduce heat island effect and air conditioning needs).	1
W1-B-2	Continue to plant more native and drought-resistant vegetation.	2
W1-B-3	Encourage developers to utilize the Sustainable Development Incentive and provide low impact development stormwater management by installing permanent infiltration or collection features (e.g., swale, culvert outfall, rainwater cistern) that can retain 100 percent of the runoff.	2

Goal W 2 Maintain source and drinking water quality through climate related challenges.

Strategy W 2-A:

Improve water quality protections and awareness.

Bloomington has a surface water source for drinking water, Lake Monroe. The Monroe Water Treatment Plant filters and cleans the water for public distribution. The MWTP is operated by the City of Bloomington Utilities Department. The Water Treatment Plant is a conventional settling/filtration facility and has several stages of disinfection before the water is sent out into the distribution system. According to the 2020 Annual Drinking Water Quality report, Bloomington water is within required levels of all 12 water contaminate measures, 5 of which are at or below "ideal" levels. https://cutt.ly/zggXnII

How We'll Measure Progress:
Water quality as reported through annual drinking water quality reports

Co-Benefits of Strategy:

Improved Quality of Life

Improved Community Resilience

	Actions	Implementation Phase
W2-A-1	Strengthen riparian/stream/wetland protection in local ordinances and regulations where feasible.	1
W2-A-2	Develop educational materials covering the link between water resources and climate change.	2
W2-A-3	Increase stream buffer requirements to provide additional flood water storage and minimize property damage due to erosion and flooding.	3

Goal W 3 Reduce energy use associated with treating and transporting water and wastewater by 10% of 2018 values.

Strategy W 3-A:

Reduce energy use associated with treating and transporting water and wastewater by 10% of 2018 values.

According to the 2018 GHG Inventory, processing and distributing water within the city of Bloomington consumed 10,984,760 kWh annually. Meanwhile, wastewater collection and treatment consumed 13,450,909 kWh. Reducing energy use associated with water and wastewater treatment by 10% will save over 2.4 million kWh annually.

How We'll Measure Progress:

Reported energy consumption by City water and wastewater systems

Co-Benefits of Strategy:

Improved Energy Resilience

Reduced GHG Emissions

	Actions	Implementation Phase
W3-A-1	Promote measures that reduce the energy needed to heat, treat and transport water, including continued evaluation of new hydroelectric and photovoltaic opportunities.	1
W3-A-2	Identify and support opportunities for residents and businesses - particularly those with significant hot water loads such as laundromats and hospitals - to electrify water heaters or install solar thermal technology.	2

Strategy W 3-B:

Capture and use of wastewater energy potential.

As recommended by the City of Bloomington Waste To Energy Taskforce, the City should further investigate the potential of an anaerobic digestion wastewater-to-energy installation at the Dillman Road Wastewater Treatment Plant. As outlined in the Taskforce's findings, an anaerobic digestion site could produce approximately 325 kW of electricity, which is about 36% of the plant's average electrical consumption.

How We'll Measure Progress:

Status of study

Co-Benefits of Strategy:

Reduced Costs

Reduced GHG Emissions

	Actions	Implementation Phase
W3-B-1	Research into biogas opportunities at the City's wastewater treatment plant and explore opportunities for renewable natural gas development capacity.	1
W3-B-2	Following completion of study for retaining City wastewater treatment plant produced Renewable Natural Gas (RNG) and kWh for City heating and electrical needs implement recommendations of study.	2

Goal W 4 Mitigate flood hazards and impacts.

Strategy W 4-A:

Update design standards and plans for flood mitigation.

How We'll Measure Progress:
Status of flood mitigation standard plan integration

According to “Hoosiers’ Health in a Changing Climate: A Report from the Indiana Climate Change Impacts Assessment,” Indiana will see an annual precipitation increase of 6-8% by 2050 with an increase in the likelihood of heavy downpours. Meanwhile, changes in precipitation patterns are projected to increase Indiana's drought potential severity index by 5% - meaning heavier rainfalls will likely be falling on harder ground more susceptible to increased water runoff and flash flooding. Maintaining community plans and design standards based on projected climate impacts will be key in minimizing flood hazard threats.

Co-Benefits of Strategy:

Improved Community Resilience

	Actions	Implementation Phase
W4-A-1	Review and update public infrastructure design standards and the City's Stormwater Management Plan to meet climate change projections for Bloomington.	1
W4-A-2	Perform a flood risk assessment using historical data and future precipitation forecasts to identify areas and critical infrastructure vulnerable to flooding.	1
W4-A-3	Continue to restore and maintain creeks to accommodate increased rain events. Review standards and ensure they include projected precipitation levels due to climate change. Creek restoration can reduce the likelihood and magnitude of flooding and support healthy habitat.	2
W4-A-4	Determine stormwater volume requirements meeting anticipated future storm levels and identify stormwater management systems and infrastructure not capable of meeting projected needs. Prioritize upgrades required and implement. Integrate upgrades into already scheduled maintenance programs and budgets.	2
W4-A-5	Expand inclusion of green infrastructure in City's Stormwater Management Plan. Identify specific types of green infrastructure to implement including: parking lots, alleys, parks, vacant lots, parkways, and grading near sidewalks. In addition, identify property owned by other public entities that have a high potential for improved ecological management to improve stormwater management functions.	2
W4-A-6	Modify water utility bills to provide education to residents on what actions they can take to reduce their risk to extreme precipitation events and flash flooding. Develop an information HUB with tools and resources. (e.g. https://www.cnt.org/tools/my-rainready-home-assessment-tool)	2
W4-A-7	Build more permeable parking lots and driveways and use more recycled materials with concrete.	3

Water and Wastewater

Strategy W 4-B:

Increase green infrastructure capacities citywide.

How We'll Measure Progress:

Reported number, coverage, and capacity of green infrastructure installations

Green infrastructure strategies can build soil quality and improve the permeability (or absorbency) of the soil. The more permeable the surface, the less stormwater runoff there will be, reducing flood risks. Porous natural landscapes, such as meadows and forests, can soak up as much as 90 percent of the rain or snowmelt. By reducing stormwater runoff and protecting floodplains, green infrastructure can help manage both localized and riverine floods.

Co-Benefits of Strategy:

Improved Community Resilience

Protected / Enhanced Ecosystems

	Actions	Implementation Phase
W4-B-1	Promote native landscaping to help restore and conserve natural habitats and avoid turf grass.	1
W4-B-2	Encourage use of rain gardens at public agency sites as well as commercial and residential sites.	1
W4-B-3	Add stormwater absorption features, such as bioswales, rain gardens, and pervious pavement systems to City-owned space.	1
W4-B-4	Prioritize restoration types and areas to increase and improve stream and wetland protection and restoration; develop funding strategy.	2
W4-B-5	Leverage resources to support neighborhood green infrastructure grants and ongoing maintenance.	2
W4-B-6	Incentivize and prioritize the development of “green infrastructure” such as parks, wetlands, riparian and wildlife corridors, natural drainage-ways, and low-impact development. Research green infrastructure implementation and long-term viability in local environment.	2
W4-B-7	Increase the number of public and private use of raingarden and other infiltration projects.	3

Water and Wastewater

Planned Water and Wastewater GHG Emission Reductions

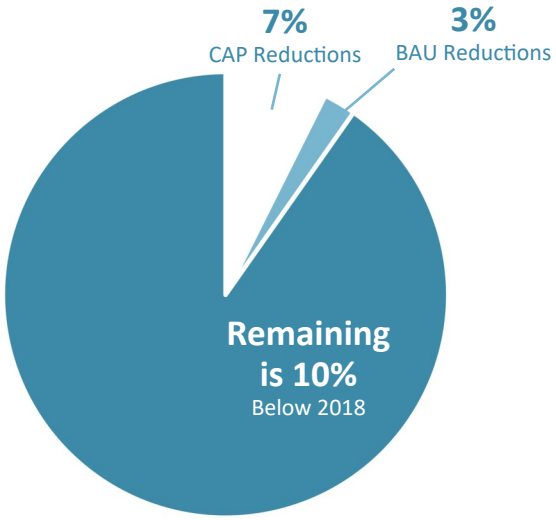
Planned Sector Emission Reductions Through 2030

The strategies and actions included in this section of the Climate Action Plan are projected to reduce the city's annual GHG emissions by 1,100 metric tons (MT) by 2030 - a 7% reduction over 2018 levels. Changes in business-as-usual impacts are anticipated to reduce an additional 350 metric tons for a total community wide water and wastewater sector reduction of 10% over 2018 levels.

This is equivalent to eliminating **3.2 million** cubic feet of man-made greenhouse gas atmosphere annually by 2030.

Sector Emissions Reduction below 2018 Achieved by 2030

The total change to sector emissions include CAP Plan reductions as well as BAU emission changes as follows:



Individual Strategy Annual Emission Reductions by 2030

Below are the CAP Plan reductions by strategy for this sector:

Strategy	Annual GHG Reductions by 2030
Strategy W 1-A: Promote increased water conservation citywide.	**300 MT**
Strategy W 1-B: Maintain and update city plans and standards in support water conservation goals.	N/A
Strategy W 2-A: Improve water quality protections and awareness.	N/A
Strategy W 3-A: Reduce energy use associated with treating and transporting water and wastewater by 10% of 2018 values.	**800 MT**
Strategy W 4-A: Update design standards and plans for flood mitigation.	N/A
Strategy W 4-B: Increase green infrastructure capacities citywide.	N/A

What You Can Do

- Turn off the faucet while brushing your teeth.
- If you have dishwasher, use it. Research shows we use more water washing dishes by hand than running a full or nearly full dishwasher.
- If you have a lawn and garden irrigation system, or use hoses and sprinklers, water thoroughly less often, and do so in the early morning or evening. Alternatively, install a Smart Irrigation Meter to Prevent watering grass that doesn't need it.
- Collect rainwater and use it for indoor and outdoor plants.
- Install — or have a licensed plumber install — water-saving aerators on showerheads and faucets throughout your home.
- Install — or have a licensed plumber install — a water-saving low-flow toilet.
- Reduce or eliminate use of fertilizers and pesticides on lawns to protect surface water quality and ecosystem health.
- Convert lawn areas to native, drought resistant landscaping that does not require watering.