

WASTEWATER

GRADE: D-



Introduction

Wastewater infrastructure throughout Indiana typically includes sanitary and combined sewer collection and conveyance systems, treatment systems, and operation and maintenance components. Wastewater systems require continual attention for operation and maintenance, rehabilitation/replacement of aging components, and capacity upgrades, as well as to comply with regulatory requirements. The availability of increased funding resources would greatly enhance the ability of wastewater systems to meet the continual demands imposed on them.

In developing this report, research was based on existing available data relating to municipal wastewater collection and treatment systems. Topics not evaluated include private on-site systems, pre-treatment facilities, and pre-treatment systems.

Capacity and Condition

Sewers throughout the country, including Indiana, were constructed beginning in the late 1800s. These sewers conveyed waste and stormwater to nearby bodies of water for disposal. In the mid 1900s, communities started constructing wastewater treatment plants and separate sanitary and storm sewer systems. Secondary and tertiary treatment processes were added to many Indiana wastewater treatment facilities in the 1970s and 80s when sufficient federal grant funding was available to most communities. Communities with older sewer systems maintained sewers that conveyed both sanitary sewage and stormwater, referred to as combined sewer systems. Indiana has approximately 411 wastewater treatment facilities and approximately 488 sanitary sewer collection systems.¹

During wet weather events, combined sewer systems may reach and exceed design capacity. Once this occurs, the system releases untreated combined wastewater and stormwater into surface water bodies, which is referred to as a combined sewer overflow (CSO) event. There are 108 combined sewer communities in Indiana, which is 12.5 percent of the total number of CSO communities nationally, with 842 total CSO locations. The largest 14 CSO communities in Indiana discharged a combined 26 billion gallons of combined sewage into State waterways during a 12-month period in 2007 and 2008. Approximately 2.69 million people are served by combined systems. These communities are in the process of implementing Long-Term Control Plans, which identify how the community will eliminate, reduce, and provide treatment for CSO events. There are at least 10 combined sewer communities in Indiana whose individual long-term control plan needs exceed \$120 million.^{1, 2} Communities are typically given up to 20 years to implement their CSO long-term control plans.

The components of Indiana's wastewater infrastructure have a limited design/useful life. This design life is dependent upon the material type, environment, and main-

tenance. Typical design life for various wastewater infrastructure components is listed in the table below.³

COMPONENT	YEARS OF DESIGN/USEFUL LIFE
Collection Systems	80-100
Interceptor Sewers	90-100
Force Mains	25
Treatment Plants - Concrete Structures	50
Treatment Plants - Mechanical/Electrical	15-20
Pumping Stations - Concrete Structures	50
Pumping Stations - Mechanical/Electrical	15

Given the age of many of the state's wastewater infrastructure systems in comparison to their design life, many communities may have wastewater infrastructure components that are nearing the end of their useful life.

Funding

Municipalities in Indiana can typically receive funding for wastewater infrastructure projects from the following sources: Indiana Clean Water State Revolving Loan Fund Program (low-interest loans), Indiana U.S. Department of Agriculture (USDA) Rural Development (loans and grants for communities with a population of less than 10,000), Indiana Office of Community and Rural Affairs – Community Focus Fund (grants), revenue bonds, tax increment financing, and private sources. Municipalities typically repay the capital funds required to make improvements to their wastewater infrastructure through user rates.

Funding available to the state through the Indiana Clean Water State Revolving Loan Fund, Indiana USDA Rural Development, and Community Focus Fund is subject to change based on appropriations from the federal government. Table 2 summarizes funding appropriations for these agencies in 2009.

AGENCY	AMOUNT
Indiana Clean Water State Revolving Loan Fund	\$394 million
Indiana USDA Rural Development	\$50 million
Community Focus Fund	\$3.7 million
2009 Total Appropriations	\$447 million

The funding appropriations for 2009 include allocations from the American Recovery and Reinvestment Act of 2009 (ARRA), whose funds are distributed through the Indiana Clean Water State Revolving Loan Fund (\$94 million) and Indiana USDA Rural Development (\$20 million). An appropriation of \$11 million is also available for infrastructure projects (i.e., water, sewer, and storm drainage) through the Community Focus Fund.

Future Need

Future needs include resources for operation and maintenance, improvements to the current infrastructure to rehabilitate/replace worn-out and aging components, and development to accommodate population growth and increasing demands and compliance with regulatory requirements. By April 2009, the Indiana Clean Water State Revolving Loan Fund Program alone had identified more than \$1 billion in projects ready to proceed with construction.⁴ There is a strong likelihood that new nutrient (Total Nitrogen and Phosphorous) removal requirements will be required for the portion of Indiana that currently discharg-



es into the Ohio/Mississippi River basin. Those communities that discharge to the Great Lakes basin already have this nutrient removal requirement in place. Almost every existing wastewater treatment facility that discharges into the Ohio/Mississippi River basin will require upgrades at considerable cost as these requirements are implemented. These costs have not been estimated to date and are not included in any estimated costs previously presented.

Operation and Maintenance

Operation and maintenance activities for a wastewater system occur on a continual basis. General operation and maintenance items include labor, equipment, supplies, electrical power, and replacement parts. Sanitary sewer collection systems include cleaning, televising, flow monitoring, valve exercising, lift station pumps, emergency power generators, and supervisory control and data acquisition systems. Combined sewer systems include overflow monitoring, rainfall data collection, floatable controls at each CSO outfall, CSO storage, screening and disinfection facilities, and supervisory control and data acquisition systems. Wastewater treatment facilities include process equipment, pumps, blowers, emergency power generators, chemicals, supervisory control and data acquisition system, grit disposal, sludge disposal, laboratory analysis, flow monitoring, and pretreatment monitoring.

Municipalities incur continual costs to operate and maintain their wastewater systems. To pay for these costs, municipalities typically account for operation and maintenance in their user rates.

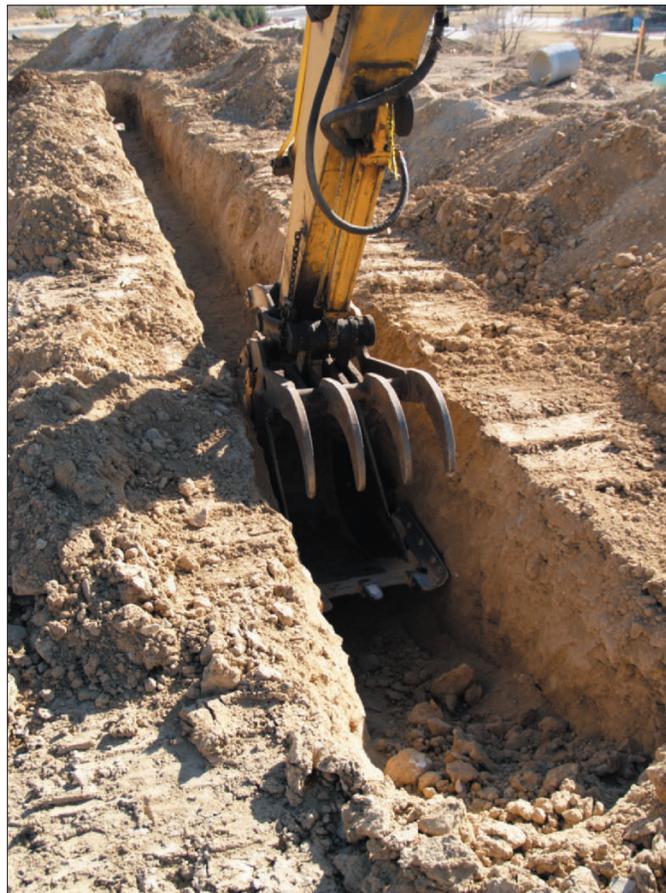
Public Safety

Wastewater systems can jeopardize public safety if untreated wastewater is released. Untreated wastewater can be released from sanitary sewer overflows, combined sewer overflows, and wastewater treatment plants. Releases can occur due to system overload as a result of wet weather, pipe breaks, pipeline blockages, or equipment failure. *E. coli* and other contaminants in untreated wastewater can also affect public health.

The Indiana Department of Environmental Management (IDEM) received reports of 80 bypass/overflow incidents in 2009. More than 285 million gallons of untreated wastewater are reported to have been released to bodies of water or on to the ground. Forty-seven of these bypass/overflow incident reports did not indicate the volume of untreated wastewater released. Therefore, the total volume released could possibly be substantially higher.

Resilience

Construction, operation and maintenance, and reconstitution of service of wastewater infrastructure are expen-



sive, and the monetary and societal costs incurred when this infrastructure fails are high. Aging, under-designed, or inadequately maintained systems discharge untreated wastewater into Indiana surface waters each year.⁵

The state's wastewater systems are not resilient in terms of current ability to properly fund and maintain, prevent failure, or reconstitute services. Additionally, the interdependence on the energy sector contributes to the lack of system resilience that is increasingly being addressed by the construction of dedicated emergency power generation at key wastewater facilities.⁵

Future investments must focus on updating or replacing existing systems as well as building new ones to meet increasing demand. In addition, operations processes need to be improved by addressing ongoing oversight, evaluation, and asset management on a system-wide basis. Watershed approaches are necessary to look more broadly at water resources in a coordinated, systematic way.⁵

Conclusion

Indiana's wastewater infrastructure grade was developed considering the evaluation category topics and computing an average for the overall grade. The grade for Indiana's wastewater infrastructure for 2010 is D-.

On a national level the wastewater infrastructure grade was D- in 2009. According to ASCE's *2009 Report Card for America's Infrastructure*, Indiana's projected wastewater infrastructure needs are \$5.86 billion, and on a national level, the needs are projected to be \$255 billion over the next five years for wastewater and drinking water.

Suggestions to increase the grade of Indiana's wastewater infrastructure system include:

- Increasing public awareness of the current system condition
- Increasing funding availability
- Continuation of combined sewer separation
- Continued research and development of products to increase the longevity of system components
- Working closely with IDEM to conduct a wastewater needs survey to get a better understanding of the condition and funding requirements of the state's wastewater infrastructure.

The low grade of the wastewater infrastructure is not truly reflective of the dedication and talent of the professionals working in Indiana, but is more reflective of continual and increasing demands combined with reduced budgets.

Sources

1. U.S. Environmental Protection Agency, Clean Watersheds Needs Survey 2004 Report to Congress, January 2008.
2. Indiana Department of Environmental Management Combined Sewer Overflow Fact Sheet, August 11, 2008.
3. Clean Water and Drinking Water Infrastructure Gap Analysis Report, p. 11, EA 816-R-02-020, September 2002.
4. State of Indiana, Clean Water State Revolving Fund Loan Program, First Amended & Restated Intended Use Plan, State Fiscal Year 2009, April 1, 2009.
5. 2009 Report Card for America's Infrastructure, ASCE.