June 2010

River Report

Clean river Healthy neighborhoods

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SOUTH BEND Clean City

For more information, please contact:
(574) 277-8515 ex. 20
CleanCity@SouthBendIN.gov
or visit
www.SouthBendIN.gov/cso

Next phase of sewer work will improve health, quality of life

South Bend's ecosystem is getting cleaner. Homeowners are confronted with fewer basement backups. And city residents are more actively enjoying the scenic vistas along the St. Joseph River, the city's most treasured natural resource.

These signs illustrate four years of progress into the City of South Bend's largest public works project ever – the federally mandated long-term control plan for combined sewer overflows. Nearly 800 other cities find themselves facing the same kind of massive investments – upwards of $50 billion – as a requirement of the Clean Water Act.

To comply with federal mandates, the City must implement a 20-year, $400-million plan for the long-term control of combined sewer overflows (CSOs). This funding level is equivalent to 2 percent of the city's median household income. Consent decree negotiations with the U.S. Environmental Protection Agency have shown that not even the greatest economic crisis in a generation can slow the pace of cities' required response.

Since 2006, the City of South Bend has invested $43 million to reduce CSOs and the problems associated with them. Efforts include expansion of the 54-year-old Wastewater Treatment Plant and extensive efforts to separate combined sewers while building capacity for additional storage. Working with partners in the private sector and academia, the City also is implementing CSOnet – becoming the world's first city to monitor and control combined sewer overflows with technology. Wireless sensors, computers and smart valves will enable the City of South Bend to control wet weather flow and save $120 million in avoided capital costs.

Between 2010 and 2013, the City will spend another $70 million to reach the midpoint of the long-term control plan. Projects will include additional separations of storm and sanitary sewers, expanded capacity to retain storm water and a greater emphasis on green solutions, which address storm drainage through natural solutions on-site.

Where sewer rates increased in stages by a cumulative 79 percent between 2006 and 2009, rate increases over the next four years will be about half as much. For a city that as recently as 1955 pumped all sewage into the St. Joseph River, an environmental turnaround takes time.

"This is a 20-year solution. These types of problems can't be solved in four years," said Public Works Director Gary Gilot. "This is about getting sewage out of basements, reducing combined storm-sanitary sewer overflows into the St. Joseph River and enhancing our quality of life in the process."

> "This is about getting sewage out of basements, reducing sewer overflows and enhancing our quality of life …"
>
> *– Gary Gilot*
> *Director of Public Works*

This River Report details what the City has achieved in the first four years of the CSO long-term control plan as well as anticipated projects for the next four years. It also features helpful background on CSOs and highlights some of the innovative approaches that characterize South Bend's response to this issue.

More information is available on the City of South Bend web site at www.SouthBendIN.gov/cso

Water quality problems in the St. Joseph River and their causes

The St. Joseph River is a valuable community resource enjoyed by Olympic-caliber kayakers, recreational canoeists and weekend sport fishermen. Its water quality has improved dramatically since the 1950s, with more than 80 species of fish now found in the watershed and scores of parks and recreational areas lining its banks. (See related story.)

With the river's resurgence, the communities of South Bend, Mishawaka and Elkhart are planning more recreational and economic opportunities on their waterfronts.

Despite this progress, the St. Joe still doesn't meet federal Clean Water Act goals.

From Elkhart to the Indiana-Michigan state line, the St. Joseph River doesn't meet recreational water quality standards for *E. coli* bacteria about 20 percent of the time during a typical year — and 16 percent of the time during the warm-weather months when people use the river for recreation.

E. coli bacteria is an indicator of human or animal waste and potentially disease-causing organisms in the water. Some *E. coli* in a waterway is natural, but high levels have been linked to stomach cramps, diarrhea and other gastrointestinal illnesses among swimmers and people who ingest or swallow water during recreation. Children, the elderly and people with weakened immune systems or chronic conditions are most at risk.

During dry weather, approximately 97 percent of St. Joe River water samples meet *E. coli* standards. When it rains, however, many sources combine to cause high *E. coli* bacteria levels in the river. These sources include:

- Sewage overflows during wet weather from cities with combined storm-sanitary sewer systems (South Bend, Mishawaka, Elkhart and Goshen)
- Stormwater runoff from farms and animal feedlots
- Stormwater runoff from parking lots, yards and other areas with wildlife and pet waste
- Runoff from neighborhoods with failed septic systems

The U.S. Environmental Protection Agency and Indiana Department of Environmental Management require cities with combined sewers to develop long-term plans to reduce sewer overflows. Cities also must implement regulations and educational programs to reduce storm-water pollution.

State and local health departments regulate private septic systems and property owners are responsible for properly maintaining those systems. State environmental regulations also govern farms with confined feeding operations.

However, more efforts will be needed in the future to protect the St. Joe — and people who use it — from stormwater runoff, agricultural runoff, failing septic systems and other pollution sources.

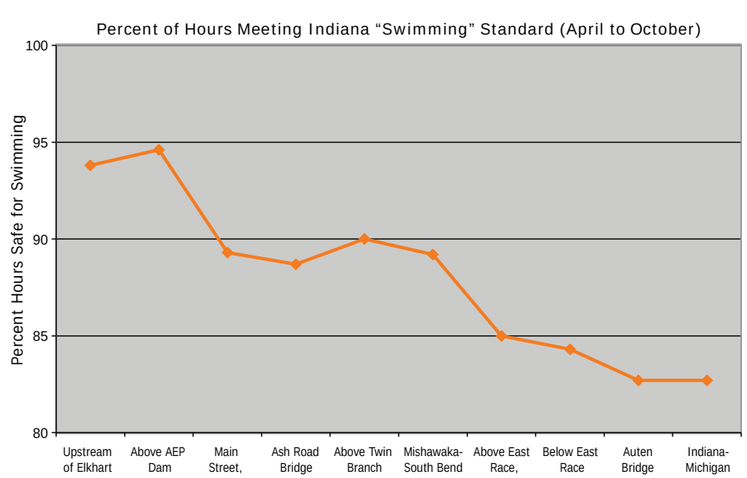
Fish life improves in St. Joseph River

Studies of aquatic life and local fish population in the St. Joseph River in 2009 recorded long-term improvements in the South Bend area, as measured at several points along the St. Joseph River.

Index of Biotic Integrity scores used to assess fish communities all fell within the good range at the five monitoring locations along the St. Joseph River around South Bend, demonstrating marked improvements from previous studies in 2007. Fish community conditions approached excellent at Brick Road (just north of the city limits).

In 2009, more than 9,300 fish, representing 14 families and 58 species, were collected in St. Joseph County, of which longear sunfish, smallmouth bass and rock bass were the most abundant.

While the City of South Bend measures chemical and microbial composition of water, this additional biological data (collected through a partnership with the City of Elkhart's Aquatics Program) gives a more accurate representation of the St. Joseph River's overall health.



This chart shows how well the St. Joseph River meets Indiana's swimming standard at different locations. The orange line represents the river's water quality during the warm weather months, when people are most likely to be in the water. As you can see, the river meets the E. coli *bacteria standard about 90-95 percent of the time during warm weather in Elkhart and Mishawaka. But by the time the water flows through South Bend, standards are met 80-85 percent of the time. Sewer overflows, urban stormwater, failing septic systems and farm runoff all contribute to this problem.*

Why our sewers overflow when it rains

Every year, more than 850 billion gallons of untreated sewage flows into our nation's rivers, lakes and bays.

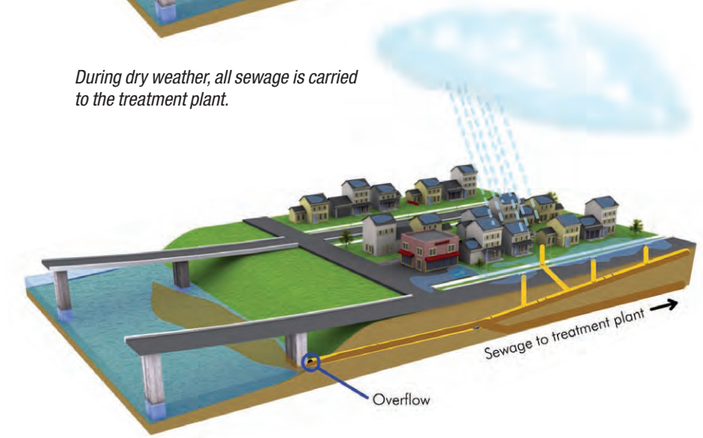
These sewage overflows come from antiquated "combined" sewer systems built as many as 100 years ago in many U.S. cities.

South Bend, Mishawaka, Elkhart and many other cities built storm sewers in the early 1900s to carry rainwater and melting snow away from homes, businesses and streets. In those horse-and-buggy days, these cities didn't have sewage treatment or even indoor plumbing.

When indoor plumbing came later, homeowners and business owners hooked their sewage lines to the existing storm sewers, combining storm water and raw sewage into one pipe. The pipes emptied directly into the river, until the 1950s when sewage treatment plants were built. This was common practice in many U.S. cities, especially in the Northeast and Midwest. During dry weather, a "combined" sewer system works much like a separate sewer — carrying all sewage to the treatment plant for treatment.

However, when it rains or snow melts, the sewers can be overloaded with incoming stormwater. When this happens, the sewers are designed to flow over internal dams in the underground pipes and into nearby streams and rivers. If they didn't have this release valve, raw sewage would back up into people's basements and streets.

During dry weather, all sewage is carried to the treatment plant.



When it rains or snow melts, the sewers can be overloaded with incoming stormwater.

Combined sewer systems: nationwide problem

Combined sewer systems carry both stormwater and raw sewage in the same pipes. Many cities with combined sewer systems have problems with raw sewage overflows when it rains. These overflows contain not only stormwater, but also untreated human and industrial waste, toxic materials and debris. Combined sewer systems serve roughly 772 communities containing about 40 million people, according to the U.S. Environmental Protection Agency. Most communities with combined sewer systems are located in the Northeast and Great Lakes regions and in the Pacific Northwest. Indiana has more than 100 communities with combined sewers.

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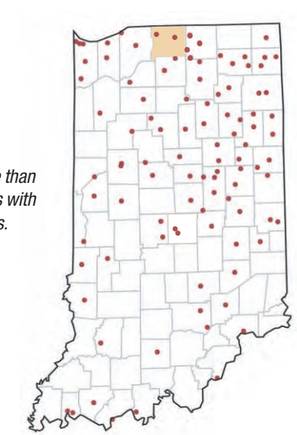
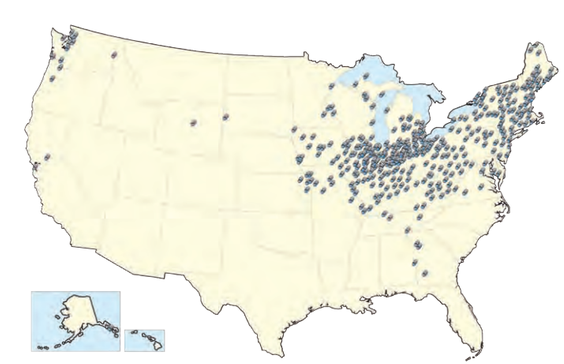




Combined sewer systems are found in roughly 772 communities serving about 40 million people, according to the U.S. Environmental Protection Agency.

Progress achieved on basement backups, flooding, river quality

Community residents may regard the new Riverside Trail and the extended Northside Trail as the most dramatic improvements along the St. Joseph River in South Bend during the past four years.

Less visible, but more significant to the river's ecosystem and public health, is the $43-million investment the City of South Bend has made since 2006 in the first four years of implementing a federally mandated, 20-year plan to control combined sewer overflows.

The results are evident. Even with rainfall that was 20 percent higher, the number of basement backups because of City pipe blockages in 2009 declined by 20 percent when compared with 2005. The City also reduced overflow to the river – 60 million gallons fewer in 2009 than in 2005.

Major efforts included expansion of the City's Wastewater Treatment Plant, opened in 1956, and a dozen major projects to separate storm and sanitary sewers citywide in neighborhoods with chronic basement backups of sewage. In addition, five projects involved either the construction or expansion of basins or wet-weather retention areas. At the same time, the City has invested in pioneering, high-tech solutions like CSOnet to achieve the intended scope of the 20-year plan, while reducing the anticipated $400 million cost. (See page 9.)

> *The number of basement backups has declined by 20 percent and 60 million fewer gallons have over-flowed into the St. Joseph River.*

"The people of South Bend can take pride in the progress we've made in restoring the St. Joseph River. Before the wastewater treatment plant opened, 100 percent of the sewage went directly into the river. Today, we are capturing and treating 90 percent of the waste," said Public Works Director Gary Gilot. "In the past four years, we've made tremendous strides toward the preservation of our most precious natural asset."

A primary achievement was a $4.1 million upgrade of the City's Wastewater Treatment Plant, enabling it to treat and process up to 77 million gallons of flow per day during wet weather. (During dry weather, the plant typically treats an average flow of 40 million gallons per day.) The upgrades eliminated hydraulic bottlenecks, allowing the treatment plant to reach levels mandated by the federal National Pollution Discharge Elimination System. The City added new blowers with premium efficiency motors, which enable the treatment of more wet-weather flow while saving energy. Replacements and upgrades to pumps also helped enable the plant to treat about 2 billion more gallons of combined sewage each year.

The City also worked with the University of Notre Dame to reroute Notre Dame's sewer line from the interceptor sewer, the primary line running along the river that conveys outflow to the wastewater treatment plant. The new line, which runs north of Saint Mary's College, goes directly to the treatment plant, eliminating overflow possibilities and significantly reducing overflow potential along its former connection to the interceptor at Angela Boulevard and Riverside Drive.

Here are the Phase 1A accomplishments, listed by area:

NORTHEAST

- Edison Park – A storm sewer separation eliminated basement backups and dramatically reduced neighborhood storm surcharging and combined flow from the area, which formerly fed into a trunk line that went south along Ironwood Road to the interceptor along the river. Neighbors along Ironwood also have reported benefits.
- Cedar/Rockne/Madison area – A storm sewer separation reduced neighborhood sewer surcharging during storms and basement backups, also easing flow along the Ironwood trunk line.
- Harter Heights – A separation and new storm outfall near North Shore Drive and Michigan Street have greatly reduced basement backups. (More storm trunk extensions may come later in Phase 1.)
- Pleasant Street – A sewer separation was extended along Pleasant to address chronic basement backups. A second phase, now in design, is anticipated by 2013.

SOUTH

- Miami/Ridgedale – Drainage improvement efforts solved localized surface drainage problems.
- Kensington/Crest Manor – Basement backups have been reduced with help from a new storm sewer separation, combined with new controls for water flow and levels in a series of four wet ponds.
- Fairfax Estates – Significant drainage improvements, a new separated storm sewer along Miami Road and the creation of a large dry basin have helped in areas that have seen severe flooding and faced gravity challenges for post-storm drainage. The new system also closed an open ditch along Fairfax Drive.
- Twyckenham Drive – Construction of a new trunk storm sewer is under way, a project that will provide a new storm outfall to the river and a large trunk line for storms only. The line runs along the full length of Twyckenham (south from the river), providing capacity for future separations both to its west and east.

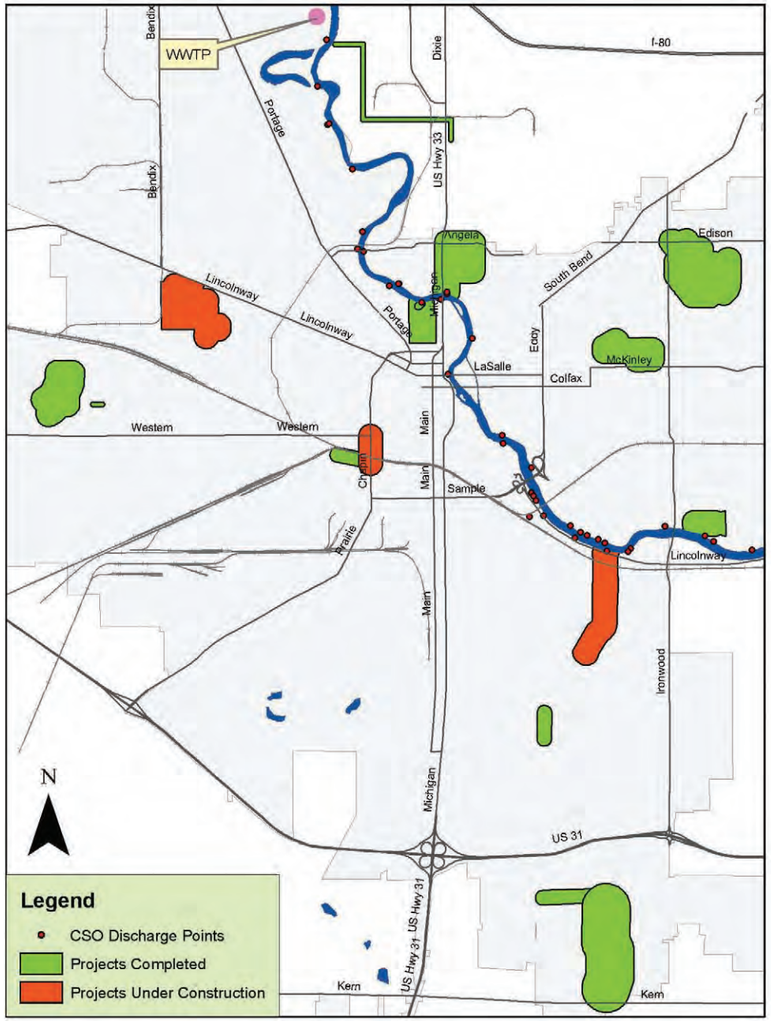
NORTHWEST

- Leeper Park odor controls – At Lafayette Boulevard and Riverside Drive, a new flower bed actually is part of a biofiltration system – an innovative green solution to chronic sewer-odor problems. At the river crossing, where foul-smelling gases separated from the highly organic solution and vented into the air (much like a trap under a homeowner's sink), a new solution was found. The odors are eliminated through a network of perforated pipes that filter the gases through a mulch bed of wood chips, compost and naturally occurring microorganisms. The result saved the City $1.3 million when compared with conventional solutions.

WEST

- Washington/Burbank area – Chronic basement backups were reduced by means of a storm sewer separation.
- Washington Street – A second Westside neighborhood received relief from basement backups with another storm sewer separation project.
- Oliver Industrial Park – Expansion of a basin serving the industrial park relieved drainage from near Western Avenue and Chapin Street (near the site of the St. Joseph County Salvation Army Kroc Community Center), diverting water from a trunk line along Prairie Avenue. In the next phase, this basin will be connected to a network of basins near Sample and Olive streets.
- Diamond Avenue – Design of a new trunk storm sewer will follow Diamond from Lincoln Way West to Walnut and Euclid, where it picks up storm water from a large, previously separated area (known as Model Cities). Downstream near Angela Boulevard and Riverside Drive, the design will feature an open channel resembling a natural creek as it crosses the Riverside Trail and drains into the river. (See Page 12.)

Phase 1A



- Kennedy Park – The City relied on green solutions on a storm sewer separation project currently under way in an area stretching from Bendix Drive to Olive Street and Lincoln Way West to Kennedy Park. Bio-retention areas in the park will collect much of the rain water draining from the street. In addition, traffic triangles and curb bump-outs will both help drainage and calm neighborhood traffic.
- LaSalle Academy area – Design is nearly complete of a Phase 1B project to build a separate storm sewer to drain the gravel pits near Lathrop Street and Bendix Drive.

The first four years of the control plan, mandated by the U.S. Environmental Protection Agency and the Clean Water Act, was funded by a cumulative 79 percent staged increase in sewer rates between 2006 and 2009. Proposed rate increases for the next four years will be about half as much.

Next phase targets storm-water management

CSOnet's technological innovation and low-impact green solutions represent two examples of best-in-class environmental stewardship fully deployed in the next phase in South Bend's journey to reducing combined sewer overflows (CSOs.)

But more than three-fourths of the $70 million invested in Phase 1B of South Bend's CSO Long-Term Control Plan will fund 14 projects that will help the city comply with mandates set by the U.S. Environmental Projection Agency.

Projects to separate storm and sanitary sewers account for two-thirds of the work planned between 2010 and 2013. Yet a number of the projects also involve building new conveyance systems to move storm water more efficiently. At least four projects require construction to expand or improve the storage capacity of existing basins.

Priorities targeted in the next four years include:

- Wastewater Treatment Plant preservation and upgrades – $15 million
- Extensions and replacements of aging sewers – $16 million
- Other capital projects for CSO long-term control plan – $39 million

About one-fifth of the resources needed for Phase 1B will help preserve the Wastewater Treatment Plant, maximizing its capacity to treat sewage during wet weather. Like a kitchen sink full of food particles but with an undersized garbage disposal, the treatment plant will require about $15 million in upgrades to enable adequate processing during periods of heavy rainfall. Seven upgrade packages over time, totaling nearly $50 million, will help expand the treatment plant's wet-weather capacity from 77 million to 100 million gallons per day.

The city's existing sewer system includes segments still functioning more than a century after installation. The ongoing extension and replacements of aging sewers will ensure a functioning sewer network. Other investments will help upgrade lab equipment, replace existing equipment, support the sewer lining program and enable emergency sewer repairs.

Here are descriptions of the major projects planned for Phase 1B:*

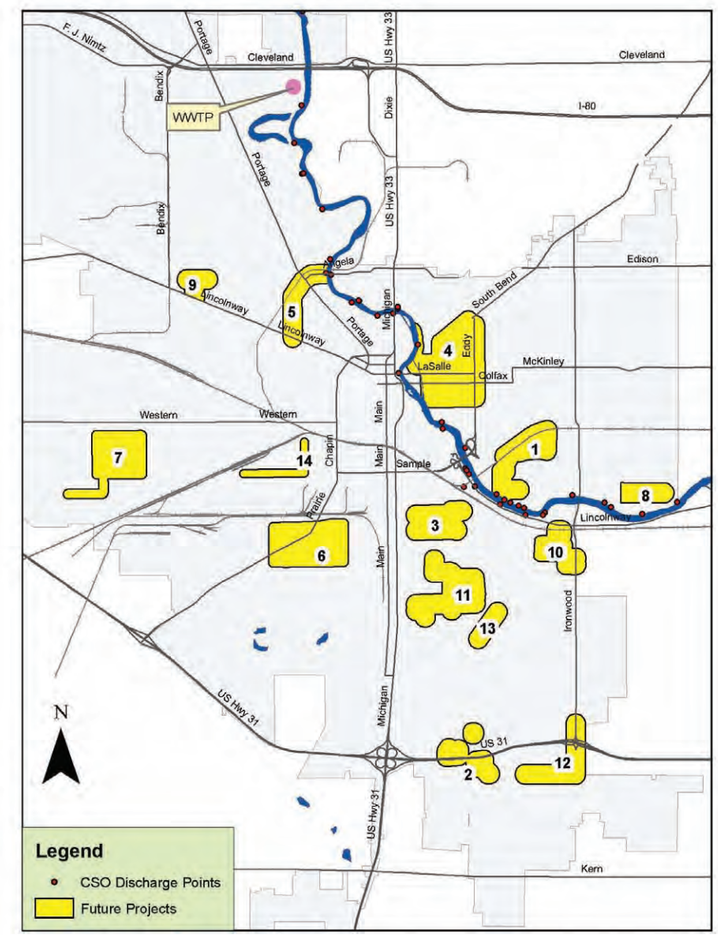
1. Southwood sewer separation: Combined sewers now discharge storm-water runoff from this east-side neighborhood near Potawatomi Park. In this project, crews will separate combined sewers along Southwood, Belmont and Hoover avenues. Stormwater will be conveyed through an existing storm sewer along Emerson Street to the St. Joseph River. Cost: $770,000
2. Clyde Creek basin management: The installation of automated controls at outlets in the Clyde Creek basin system will enable a more efficient way to store storm water near Erskine Golf Course and Erskine Village shopping center. This will allow for regulated discharge of large volumes of storm-water runoff. Combined sewers near the basin also will be separated. Cost: $260,000

> *More than three-fourths of the $70 million invested in Phase 1B will fund 14 projects that will help the city comply with mandates set by the U.S. Environmental Protection Agency.*

3. Haney-Dubail sewer separation: The separation of combined sanitary and storm sewers in this neighborhood southeast of downtown will relieve basement flooding and the conveyance through a major trunk sewer. Strom water will be discharged naturally through Bowman Creek. Cost: $2 million
4. East Bank sewer separation: This project impacts one of the largest geographic areas in Phase 1B. Combined sewers will be separated in an area bounded by Niles Avenue on the west, South Bend Avenue on the north, Eddy Street on the east and the Cooper Street Bridge (Eddy/Sample streets) on the south. The site of former St. Joseph Regional Medical Center is within this area. This project will support the City's redevelopment of the area by providing new storm sewers adequate to meet the needs of future growth. Cost: $10.2 million
5. Diamond Avenue trunk sewer: A major trunk sewer following Diamond Avenue from Lincolnway to Walnut and Euclid will convey storm water from a previously separated area, known as "Model Cities." Near Angela Boulevard and Riverside Drive, the project will use an open natural channel creek to return storm water to the St. Joseph River. Cost: $13.5 million (For more information, see Page 12.)
6. Prairie Avenue: Separation of combined storm sewers will relieve basement flooding in a residential area generally bounded by Ewing Avenue, William Street, Indiana Avenue and Grant Street. This project will expand capacity in local collector sewers. Cost: $6 million
7. Sample/Gladstone/Huron/Kenmore: A west-side residential area, now subject to many reports of flooded basements, would receive relief through a project to separate combined sewers. Storm water will be diverted to a ditch that now carries discharge from the Lombardy Street storm sewer (to the Kankakee River basin). Currently, storm water has been diverted to the St. Joseph River via the combined sewer system. The result will relieve basement flooding and remove excess storm-water runoff from the Northwest Trunk Sewer. Cost: $6 million
8. Pleasant Street sewer separation, part 2: Already in design, this project builds upon work completed in Phase 1A. The new storm sewer would be extended east along Pleasant Street to 36th Street. Cost: $1.9 million
9. LaSalle Academy area: Combined sewers would be separated in neighborhoods in the vicinity of LaSalle Intermediate Academy. New systems would convey storm water to an existing pond northwest of the school. Cost: $1.8 million
10. Randolph/Sampson basin and sewer system: A basin serving this southeast side residential area will be expanded to handle additional storm-water runoff. In addition, studies will determine where sanitary and storm sewers are combined. Sewer separation work will proceed as needed. Neighborhoods south of the basin will experience basement flooding relief. Cost: $660,000
11. High Street sewer separation: Basement flooding relief will result from a storm/sanitary-sewer separation impacting this neighborhood south of Riley High School. Separation of combined sewers between Carrol and Miami streets along Eckman Street and between Altgeld and Irvington would provide flooding relief. In addition, surface runoff from Riley High School could be discharged into Bowman Creek. Cost: $3.7 million
12. Kensington: The connection of an existing basin in the Crest Manor subdivision to a new basin in Fairfax Estates would remove drainage from the area's combined sewer system. In addition, crews would build a pump station to transport storm flow to the Ireland/Ironwood retention basin. Cost: $1.6 million
13. Twyckenham – part 2: A trunk storm sewer constructed during Phase 1A would be extended to Ridgedale Road. This would remove storm water from the combined sewer system. Cost: $2.5 million
14. Oliver Plow – part 3: Construction of a new outfall for a basin built in Phase 1A will direct storm-water flow west along Sample Street to existing basins near the A.J. Wright Distribution Center at Sample and Olive streets. Cost: $1.2 million

* Numbers correspond with project locations on the map. Areas designated represent the larger neighborhood that will benefit from improvements rather than immediate areas impacted by construction.

Phase 1B



Sustainability drives focus on green solutions for low-impact development

Plans for deep tunnels or completely separate storm and sanitary sewers are two high-cost ways cities have sought to control combined sewer overflows. Among other options, the City of South Bend is trying green solutions that achieve results, sometimes at less cost than conventional solutions.

In 2009, the City of South Bend entered into a contract with Walkerton-based JF New, one of the nation's leading full-service ecological firms, to help the City implement solutions that are better for the community's environment and its pocketbook.

This approach – known as low-impact development – is shaping South Bend's approach to addressing combined sewer overflows. Best management practices are expected to reduce overflows, improve the environment and encourage stewardship at the local level.

Low-impact development emphasizes conservation and use of on-site natural features to protect water quality. Instead of high-cost sewer infrastructure, this approach provides an alternative to traditional storm water practices, such as detention and retention ponds. Instead, low-impact development seeks replicate a site's natural ecological features to restore storm water to the groundwater table. Rather than transmit rainfall through the City's combined sewer system, low-impact development seeks to detain runoff as close to its source as possible.

Center grass medians are a green solution for returning storm water to the earth.

"Low-impact development techniques are based on the premise that storm water is a resource, not a waste to be quickly transported and disposed of somewhere else," according to Gary Gilot, director of public works. "Instead of conveying and managing/treating storm water in large, costly, end-of-pipe facilities often located at the bottom of drainage areas, low-impact development addresses storm water through small, cost-effective landscape features."

At Odyssian Technology, 511 E. Colfax Ave., storm-water runoff from an adjacent impervious parking lot is directed to a rain garden, rather than into the sewer system. A rain garden is a shallow depression that collects a few inches of precipitation during a storm, but it is designed to dry up in a day or two after the rain stops.

Featuring attractive native plants that are drought tolerant, the rain garden's design helps create small channels that help rainwater infiltrate the soil. Other low-impact development features include constructed wetlands; bioswales, which convey storm water through channels featuring natural filtering elements; and riparian buffers, thickly vegetated areas next to waterways that help minimize pollution runoff.

As part of its contract with JF New, the City of South Bend is receiving:

- Training for engineers, planners, maintenance staff and others in low-impact development in order to help officials understand how to design infrastructure that has reduced environmental impact (with equal or better performance than "standard" projects) as well as how to properly maintain those projects.
- Review of all incoming projects, whether by city staff or third-party engineers, to ensure that design standards are in line with the City of South Bend's desire for green infrastructure and low-impact development.
- Examination of City codes and ordinances to identify potential concerns for future implementation of low-impact development practices.

"They are training our engineers regarding creative, natural and cost-effective solutions, such as rain gardens, bioswales and other best management practices to capture storm water near the source rather than transport it," said Mayor Steve Luecke. "We anticipate this sustainable, low-impact-development approach will save money, enhance our environment and position South Bend as an ecological leader."

Brochures help community manage storm water

"A Greener South Bend," a series of six brochures with details about water-sensitive urban design, is available for residents interested in learning about best-management practices for managing storm water that mimic the natural water cycle.

The brochures were produced by the City of South Bend in cooperation with Walkerton-based JF New, one of the nation's leading full-service ecological firms.

The brochures describe how:

- To use techniques to conserve and protect the
- Infiltration techniques soak up storm-water runoff.
- Bioswales clean storm-water runoff in naturalized channels.
- To construct wetlands to filter and remove nutrients from storm-water runoff.
- Rain gardens reduce floods, improve water quality and beautify the community.
- Riparian buffers, thickly vegetated areas next to waterways, filter out sediment from lakes, rivers and streams.

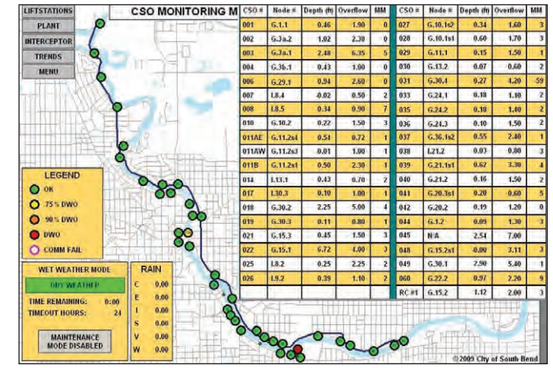
You may pick up printed copies of the brochures at any South Bend Utilities customer service desk. For a PDF of the brochure, visit www.SouthBendIN.gov/CSO.

South Bend saves money through pioneering technological breakthrough

When it comes to combined sewer overflows (CSOs), South Bend is becoming the world's first city to fully address the challenge through low-cost technology rather than relying exclusively on traditional high-cost infrastructure.

International attention is focusing on the City of South Bend's Combined Sewer Overflow Network, or CSOnet. The partnership involves researchers at the University of Notre Dame and Purdue University along with entrepreneurs at EmNet, a South Bend company.

In 2008, the City of South Bend deployed 110 wireless sensors underneath "smart" manhole covers citywide. Through an embedded radio mesh network, these small computers enable crews to monitor the depth and flow of storm water and sewage in the 500-mile sewer network. At each monitoring point, data from sensors is transmitted by radio to a nearby gateway, which uploads the data to a secure web site. City officials can access the data 24/7 at any point in South Bend's 13,100-acre combined-sewer system or at its 36 CSO outfall points.



CSO #	Node #	Depth (ft)	Overflow	MM	CSO #	Node #	Depth (ft)	Overflow	MM
001	G.1.1	0.46	1.90	0	027	G.10.1x2	0.34	1.60	3
002	G.3a.2	1.02	2.30	0	028	G.10.1x1	0.60	1.70	3
003	G.3a.1	2.48	6.35	5	029	G.11.1	0.15	1.50	1
004	G.36.1	0.43	1.00	0	030	G.13.2	0.07	0.60	2
006	G.29.1	0.94	2.60	0	031	G.30.4	0.27	4.20	59
007	L8.4	-0.02	0.50	2	033	G.24.1	0.18	1.10	2
008	L8.5	0.34	0.90	7	035	G.24.2	0.10	1.40	2
010	G.30.2	0.22	1.50	3	036	G.24.3	0.10	1.50	2
011AE	G.11.2x4	0.54	0.72	1	037	G.36.1x2	0.55	2.40	1
011AW	G.11.2x3	0.01	1.00	1	038	L21.2	0.03	0.00	3
011B	G.11.2x1	0.50	2.30	1	039	G.21.1x1	0.62	3.30	4
014	L13.1	0.43	0.70	2	040	G.21.2	0.16	1.50	2
017	L30.3	0.10	1.00	1	041	G.20.3x1	0.20	0.60	5
018	G.30.2	2.25	5.00	4	042	G.20.2	0.19	1.20	0
019	G.30.3	0.11	0.80	1	044	G.1.2	0.05	1.30	3
021	G.15.3	0.45	1.50	3	045	N/A	2.54	7.00	
022	G.15.1	6.72	4.00	3	048	G.15.2x1	-0.00	3.11	3
025	L8.2	0.25	2.25	2	049	G.30.1	2.90	5.40	1
026	L8.2	0.39	1.10	2	060	G.22.2	0.37	2.20	5
					RC #1	G.15.2	1.12	2.00	3

CSOnet computer monitors show depth levels at key points around the City, providing color-coded warnings of potential combined-sewer overflows.

Already, CSOnet is the largest cyber-physical embedded sensor network in the world. The first phase has allowed the City to achieve several objectives:

- Monitor 36 CSO outfalls, 42 locations throughout major trunk lines, five retention basins and 27 locations along the interceptor – the primary line that conveys outflow along the river to the wastewater treatment plant.
- Provide an early-warning and prevention system for dry-weather overflows to the combined sewer.
- Discover potential areas for inline storage in larger sewer lines.
- Find locations of possible bottlenecks in the interceptor and trunk lines.
- Determine the effective storage capacity of retention ponds.

This year, the City is integrating smart valves with motorized controls and overflow reservoirs. That will allow the City to use the capacity in existing pipes and retention basins to store excess storm water until rain stops. That will help us reach three critical objectives:

- Prevent basement backups.
- Maximize flow to the wastewater treatment plant.
- Maximize storage within both the in-line and off-line storage areas.

This spring, the City is installing nine "smart valves" like these, which will control overflows remotely.

"It's similar to how we limit traffic entering freeways to control congestion," said Michael Lemmon, a Notre Dame electrical engineering professor who worked on the research, which received funding from both the City of South Bend and the State of Indiana.

The research began in 2004 and included pilot implementation in 2005. That pilot demonstration in South Bend's Miami/Ireland basin proved the economic feasibility of using an embedded, decentralized network to solve the CSO problem on a citywide basis.

Over the long term, CSOnet is expected to have a significant impact. A study conducted by Malcolm Pirnie, an environmental engineering firm, determined that a citywide installation would reduce CSOs by up to 24 percent, according to Luis Montestruque, president and primary research investigator of EmNet L.L.C.

That's not all.

"For a $4-million investment, we'll save about $120 million by using existing assets to achieve the same level of benefit as conventional solutions," said Public Works Director Gary Gilot. "This will give us real-time control to maximize the storage capacity of our conveyance system. It gives us a new tool to prevent basement backups."

Funding the plan

Rate of sewer increases to decline in 2010-13

The average South Bend homeowner would see an annual sewer-rate increase of about a dime per day to generate the $70 million in capital needed to help South Bend meet the next phase of its federally mandated Combined Sewer Overflow long-term control plan.

Sewer rates would increase by 8 percent in 2010 and 9 percent annually in 2011-13, according to a proposal under consideration by the South Bend Common Council. Other rates on the monthly South Bend Utilities bill are expected to hold steady or decrease over the same period. (That would result in less than a 3 percent increase in customers' total utility bill, regardless of customer category.)

The sewer rate increase would go into effect July 1, 2010, and at the beginning of each calendar year. Compared with the cumulative 79 percent increase experienced by customers between 2005 and 2009, the rate of increase between 2010 and 2013 will be about half as much.

To hold annual sewer-rate increases to single digits, Mayor Stephen J. Luecke and the Council are considering a blended funding plan so utility customers don't bear all the costs of addressing chronic health issues enforced by the U.S. Environmental Protection Agency:

- First, an admini-strative change will help generate nearly $12 million in capital for the long-term control plan. The South Bend Sewer Utility makes a payment in lieu of taxes (PILOT) to the City's operating budget. That payment will be capped at 5% annual growth to allow the utility to self-fund some of the needed capital investment.
- Second, the City of South Bend will pledge $10 million in Economic Development Income Tax (EDIT) funds over the next four years, to buffer the rate increase and to support economic development-related investment in the long-term control plan.

"We have a federal mandate from the EPA to comply with the Clean Water Act and meet federal targets as soon as possible," said Gary A. Gilot, South Bend's director of public works. "But South Bend residents also have mandated us, through City Plan, to preserve the environmental beauty of the St. Joseph River and to give first priority to addressing human-health concerns, especially ending basement sewage backups while reducing overflows to the river.

"It is never popular to increase rates, but that is the necessary task before us," Gilot added. "The cost of meeting federal mandates and protecting the St. Joseph River is substantial, and our experience is being repeated in hundreds of other cities nationwide."

The City will finance projects over 20 or more years through low-interest loans or bonds. To support financing needs in 2010-13, the City must raise sewer rates each year. Projected rates are based upon a monthly residential bill of 5,000 gallons.

Even after the increases take effect, South Bend's sewer rate will be lower than those of many customers in Mishawaka and other Indiana cities, a number of which anticipate rate increases of their own. (See table.) Among all utility costs, South Bend delivers more services for a lower price.

Wastewater Rate History

Year	Percentage Increase
1988 - 2002	No increases
2003	24% (effective 7/1/2003)
2004	No increase
2005	5%
2006	29%
2007	15%
2008	11%
2009	9%
2010	8%* (effective 7/1/2010)
2011	9%*
2012	9%*
2013	9%*

* Proposed

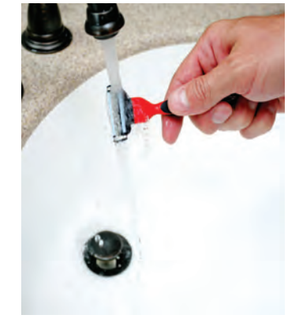
Survey of Sewer Rates
Indiana Cities and Towns over 30,000 Population

City/Town	2000 Census Population	Sewer Rate Effective Date	Residential Monthly Sewer Bill (1)
Mishawaka (2) (4)	46,557	2010	$44.26
Anderson (3)	59,734	2009	$43.17
South Bend – proposed	**107,789**	**2013**	**$42.05**
South Bend – proposed	**107,789**	**2012**	**$38.59**
Columbus	39,059	2009	$37.77
South Bend – proposed	**107,789**	**2011**	**$35.42**
New Albany	37,603	2009	$33.67
Gary (3)	102,746	2008	$32.50
South Bend – proposed	**107,789**	**2010 (effective 7/1)**	**$32.50**
Lawrence	38,915	2009	$30.42
South Bend – current	**107,789**	**2009**	**$30.08**
Kokomo	46,113	2006	$29.95
Fishers	37,835	2000	$26.00
Richmond (3)	39,124	2009	$25.89
Bloomington	69,291	2005	$25.06
Lafayette	56,397	2008	$25.01
Michigan City	32,900	2005	$24.33
Evansville	121,582	2008	$23.67
Portage	33,496	2009	$23.50
Fort Wayne (2)	205,727	2009	$23.27
Muncie (2) (3)	67,430	2010	$22.51
Elkhart (2)	51,874	2010	$22.02
Indianapolis (2) (3)	781,870	2010	$20.86
Carmel	37,733	2009	$18.14
Terre Haute (3)	59,614	2005	$16.57
Greenwood	36,037	1998	$15.55
Hammond (3)	83,048	2008	$13.38
Marion	31,320	1992	$10.51

(1) Based on 5/8-inch meter monthly billing for 6.68 hundred cubic feet (CCF) or 5,000 gallons
(2) Rate increase expected
(3) Subsidized by property tax
(4) Rate paid by non-city customers; Customers within Mishawaka city limits receive a TIF credit of $11.55 per month or a net monthly bill (with credit) of $32.71

How you can help

Ways to reduce combined sewer overflows and protect the St. Joseph River



Everyone can help solve the problem of raw sewage overflows into the St. Joseph River. Although the long-term solutions will require major investments by South Bend, Mishawaka and Elkhart, every little bit counts when it comes to reducing overflows and protecting the river. You can help in these ways:

- Disconnect your downspouts and sump pumps if they are connected to the sanitary sewer system. South Bend has a downspout disconnection programs that can provide free assistance:

  Call the Division of Engineering at (574) 235-9251 to schedule an appointment.

- Don't send fats, oils and grease down the drain. They clog both your plumbing and the sewer system, causing overflows and sewer backups. Pour the grease into a can and throw it in the trash instead.

- Clean up after your pets. Their waste adds to the problem of storm-water pollution.

- Dispose of household chemicals and used oil properly and not down the drain or down a storm sewer. Don't dump paint and oil on the ground; they will end up in our waterways. Contact your local Solid Waste Management District to learn how to safely dispose of these household hazardous wastes:

  ST. JOSEPH COUNTY
  Household Hazardous Waste Facility
  1105 E. 5th St.
  Mishawaka, IN 46544
  Phone: (574) 235-9971
  Internet: www.swmd.org

- Invite city representatives to make a presentation to your civic association or neighborhood group.

- Follow these tips for reducing water use in your homes and businesses:
  - Install low-volume toilets.
  - Check outdoor faucets, pipes, and hoses for leaks.
  - When cleaning your fish tank, use the water you've drained to water your plants.
  - Put food coloring in your toilet tank. If it seeps into the toilet bowl without flushing, you have a leak. Fixing it can save you more than 600 gallons a month.
  - Don't use running water to thaw foods.
  - Soak pots and pans instead of letting water run while you scrape them clean.
  - Direct downspouts or gutters toward shrubs and trees.
  - Use a hose nozzle and turn off the water while you wash your car and save more than 100 gallons.
  - Turn off water while you shave and save more than 100 gallons a week.
  - Plug the bathtub drain before turning the water on and then adjust the water temperature as the tub fills.

Enhancing quality of life: new amenity near Riverside Trail

When it comes to a project to improve drainage and separate combined storm and sanitary sewers in the Diamond Avenue corridor, City engineers have a jewel of an idea that began by asking, “What if?”

Typically, drainage and basement backup problems are solved by putting expensive infrastructure underground, where buried pipe is all but invisible to the average person.

What if, they asked, for the same cost the City of South Bend could create a new amenity that enhances the beauty, livability and quality of life of city residents?

So, construction will begin this year near the start of the Riverside Trail at Angela Boulevard and Riverside Drive on an open channel resembling a natural creek. Landscaped with meandering paths, the channel will move storm water from the west along Diamond to the river’s edge, where water will cascade into the St. Joseph River past a Riverside Trail overlook. (The open-air agitation of the storm water actually helps enhance the water quality before returning it to the river.)

“We asked them to do this for the same dollars as it would have taken to solve the drainage and combined-sewage basement backups with big, deep, buried sewer pipe,” said Public Works Director Gary Gilot. “The buried pipe will be needed for large sections of this overall project, but it is not the best idea as we approach the riverfront.”

In addition to the green storm-water solution, the City will also make changes to the traffic flow at the intersection by:

- Moving the intersection west, creating more park space along the river’s edge south of Angela.
- Creating a roundabout at the intersection, enhancing pedestrian safety.
- Adding additional parking for Brownfield Park along Angela.

The project has received additional input through conversations with the city park board, the Historic Preservation Commission and neighborhood residents.

Division of Environmental Services
3113 Riverside Drive
South Bend, IN 46628

printed on recycled paper

Clean river Healthy Clean City neighborhoods