



## Calumet Water Reclamation Plant



A view of Calumet WRP, looking north toward downtown Chicago

The Calumet Water Reclamation Plant (WRP) is one of seven wastewater treatment facilities owned and operated by the Metropolitan Water Reclamation District of Greater Chicago (MWRD). The MWRD is the wastewater treatment and stormwater management agency for the City of Chicago and 125 Cook County communities. We work every day to mitigate flooding and convert wastewater into valuable resources like clean water, phosphorus, biosolids and natural gas.

If you live within our service area, the water that goes down your toilet, sinks and drains eventually comes to us to be cleaned. We treat wastewater from homes and businesses throughout our 883-square-mile service area in addition to stormwater from some communities. All of this wastewater and stormwater flows through local sewers into our interceptors before flowing to WRPs where we clean the water and recover resources using a combination of physical, biological, and sometimes chemical, treatment processes.

The MWRD provides this service for over 5 million people. Nearly 450 billion gallons of wastewater is treated by our seven facilities every year.

The Calumet WRP is the oldest of the MWRD's seven WRPs. In operation since 1922, it serves residents and businesses in the southern

portion of Cook County. At the time of its opening, the 16-mile Calumet-Sag Channel had just become operational. By 1928, the plant served a population of 155,000. At present the plant's service population is over one million people in an area of about 300 square miles.

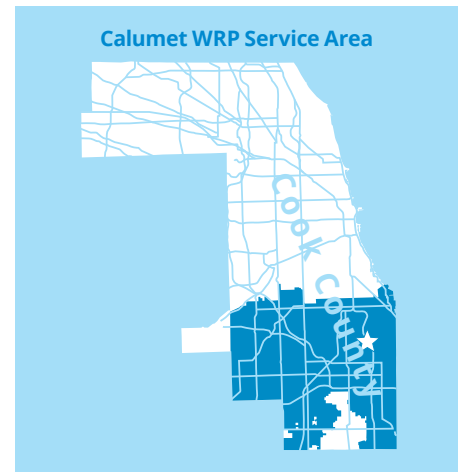
### Wastewater Treatment

Wastewater treatment works using the same processes that occur naturally in rivers to clean water, incorporating physical and biological processes with a combination of air, gravity and microorganisms. In a WRP, cleaning is sped up dramatically, so a process that could take weeks in a river happens over the course of hours.

The goal of wastewater treatment is to reduce contaminants in water, such as suspended solids, biodegradable organic matter, pathogenic bacteria and nutrients. Contaminants are removed during three major phases of treatment: primary, secondary and tertiary. All MWRD WRPs use primary and secondary treatment. Some of our facilities also apply tertiary treatment due to the nature of the waterways into which they release water. The Calumet WRP will begin tertiary treatment in 2015.

**Primary treatment:** Wastewater arrives at the plant and passes through coarse screens to filter out large debris. Then it is pumped up from sewer level and flows by gravity throughout the treatment plant. In primary treatment, aerated grit tanks and settling tanks use physical and mechanical means to remove fats and oils and to separate solids from the water. The separated solids are pumped away to undergo their own treatment process and eventually become biosolids, a sustainable alternative to chemical fertilizers. By the end of primary treatment, 60-80% of the solids have been removed.

**Secondary treatment:** In secondary treatment, a community of microorganisms help remove organic material from the wastewater. The



The Calumet WRP serves over 1 million people within 300 square miles in southern Cook County, Illinois.

### Calumet WRP Communities

- |                    |                       |
|--------------------|-----------------------|
| Alsip              | Markham               |
| Blue Island        | Matteson              |
| Bridgeview         | Merrionette Park      |
| Burbank            | Midlothian            |
| Burnham            | Oak Forest            |
| Calumet City       | Oak Lawn              |
| Calumet Park       | Olympia Fields        |
| Chicago            | Orland Hills          |
| Chicago Ridge      | Orland Park           |
| Country Club Hills | Palos Heights         |
| Crestwood          | Palos Hills           |
| Dixmoor            | Palos Park            |
| Dolton             | Phoenix               |
| East Hazel Crest   | Posen                 |
| Evergreen Park     | Richton Park          |
| Flossmoor          | Riverdale             |
| Ford Heights       | Robbins               |
| Frankfort          | Sauk Village          |
| Glenwood           | South Chicago Heights |
| Harvey             | South Holland         |
| Hazel Crest        | Steger                |
| Hickory Hills      | Thornton              |
| Homewood           | Tinley Park           |
| Lansing            | Worth                 |
| Lynwood            |                       |

### About Calumet WRP

- 400 East 130th Street, Chicago, IL 60628
- 268 employees
- 9 buildings on 275.4 acres
- In operation since September 11, 1922

### Receiving Stream

- Little Calumet River

### Treatment Volume

- 354 million gallons/day (avg.)
- 430 million gallons/day (max.)

microbes need oxygen to thrive, so air is pumped through the water in secondary aeration tanks. Next, the water enters the final settling tanks where remaining solids settle to the bottom and clean water flows out the top.

**Tertiary treatment:** Tertiary treatment includes additional processes to further clean water following secondary treatment. In 2015, Calumet WRP opened a disinfection facility that uses chlorination/dechlorination treatment that neutralizes or kills bacteria and microorganisms to reduce health risks associated with direct contact of water while recreating on a waterway. Clean water that has passed through the Calumet WRP treatment processes is released into the Little Calumet River. It only takes about eight hours for wastewater to be converted from raw sewage to clean water.

**So the water is clean; what happens to all the solids?** Solids, also known as sludge, removed from the wastewater during primary and secondary treatment are sent to temperature-controlled digesters where microorganisms break them down in a process similar to composting. As with compost, the digestion process converts nutrients into forms that plants can use, kills pathogens, and reduces odors. After digesting, the sludge passes through centrifuges which work like a washing machine, spinning at high speeds to dewater the sludge. The resulting drier sludge is aged and air-dried to refine moisture content and further reduce odors.

Approximately 100 dry tons of solids are removed from wastewater every day at the Calumet WRP and are transported to the nearby Calumet Solids Management Area for additional treatment and drying. The resulting biosolids are a sustainable alternative to chemical fertilizers and are used at golf courses,

athletic fields, parks and recreational facilities, agricultural fields, forests, and for restoration of strip mines and other disturbed lands.

**Resource recovery:** In addition to primary, secondary and tertiary treatment processes, we're also adding innovative technologies and methods of recovering nutrients, such as phosphorus, from wastewater. Nutrient pollution is harmful to waterways and aquatic life and poses a threat to healthy drinking water supplies. Phosphorus is a non-renewable resource that is in dwindling supply and is essential for high-yield agriculture and a myriad of industrial uses. The MWRD has the means to recover up to 10,000 tons per year of phosphorus and convert it into a usable, marketable product.

The MWRD is developing a system to generate energy using digester gas at Calumet WRP. Design alternatives are under review and the selection of a plan for the Calumet WRP will assist similar planning for the MWRD's Stickney Plant.

**How do we know we're doing a good job?** Wastewater treatment facilities are regulated under the Environmental Protection Agency's National Pollutant Discharge Elimination System (NPDES) permit program. NPDES permits set rigorous standards that the water from the plant must meet. The National Association of Clean Water Agencies has given the Calumet WRP the association's highest awards for compliance with these standards. We also see the benefits of our work resulting in increased recreation on the waterways, such as kayaking and canoeing, a rebounding aquatic habitat and increases in fish species. We're reducing energy use at our facilities with a goal of energy neutrality by 2023, and we're recovering valuable resources and expanding the use of biosolids throughout the region.



Microbes such as these stalked ciliates help remove bacteria and organic material from the water in secondary treatment.



**If you flush a toilet in Blue Island, it takes about 4.5 hours to get to Calumet WRP (in dry weather) and about 8 hours to go through the treatment process before it is released as clean water to the Little Calumet River.**

**Coarse screens catch large objects and debris in water as it enters a wastewater treatment plant.**

Some of the things that have turned up in the coarse screens of our plants over the years include:

- ✓ A 14" diameter snapping turtle
- ✓ Car wheels and tires
- ✓ 2x4 studs
- ✓ Super balls
- ✓ Parking blocks
- ✓ Money
- ✓ A huge ball of rope
- ✓ A 50 foot extension cord
- ✓ Mop heads
- ✓ Tree branches
- ✓ Two opossums
- ✓ ID card of a man from Argentina
- ✓ A bowling ball (with no pins)
- ✓ Fish
- ✓ A prosthetic leg



MWRD biosolids, a sustainable alternative to chemical fertilizers, help beautify the Chicago Park District's Ping Tom Park.