James C. Kirie Water Reclamation Plant

Kirie Water Reclamation Plant

The James C. Kirie 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 Kirie WRP opened in 1980, making it the newest of the MWRD's seven wastewater treatment plants. The plant is named after James C. Kirie, a Commissioner with the MWRD and a strong supporter of the MWRD's Tunnel and Reservoir Plan (TARP). At the time of its opening in Des Plaines, the MWRD's six other plants operated with partial computerization and partial manual controls. The 108-acre Kirie Plant is the first among the MWRD's plants to feature fully automated operations. The award-winning Kirie Plant serves a population of about 264,000 residents in a 65.2-square-mile service area which includes Arlington Heights, Elk Grove Village, Mount Prospect, Wheeling, and part of Rolling Meadows and Des Plaines.

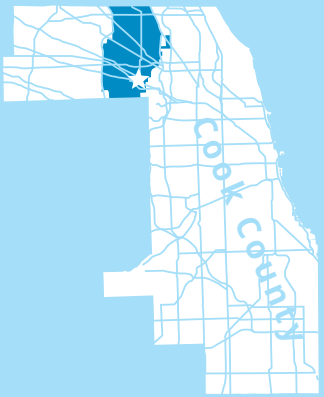
Wastewater Treatment

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.

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, primary 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

Kirie WRP Service Area



The Kirie WRP serves 264,000 residents in a 65.2-square-mile service area northern Cook County, Illinois.

Kirie WRP Communities

Arlington Heights
Buffalo Grove
Des Plaines
Elk Grove Village
Mount Prospect
Prospect Heights
Rolling Meadows
Wheeling

About Kirie WRP

- 701 Oakton Street, Des Plaines, IL 60018
- 49 employees
- 7 buildings on 108 acres
- In operation since May 12, 1980

Receiving Stream

- Higgins Creek

Treatment Volume

- 52 million gallons/day (avg.)
- 110 million gallons/day (max.)

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 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 any additional processes used to further clean the water after it passes through secondary treatement, including filtration and disinfection via ultraviolet light exposure or injection of chemicals containing chlorine. At Kirie, water is disinfected by injecting chlorination and dechlorination chemicals, filtered by sand filtration and finally aerated via post-aeration tanks. Clean water that has passed through the WRP treatment processes is released from the Kirie WRP into Higgins Creek. It only takes 24 hours for wastewater to be converted from raw sewage to clean water. The same transformation would require several weeks in a natural waterway.

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.

The sludge removed from wastewater every day at the Kirie WRP is pumped to the Egan WRP for digestion and then hauled by truck to solids management areas 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.

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

Resource recovery: In addition to primary, secondary and tertiary treatment processes, we're also testing 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.

Sewerthermal energy: The "sewerthermal" energy recovery facility at Kirie began as a demonstration project in 2012. The plant's aeration pools maintain a near-constant temperature of 55 degrees Fahrenheit, making them ideal as heat transfer sources to heat and cool the buildings at the plant. The sewerthermal energy recovery is made possible through a partnership with chemical engineers at the University of Illinois-Chicago and funding support from the Illinois Clean Energy Community Foundation. The geothermal energy recovery project allows the plant to reduce its heating and cooling expenses and the MWRD estimates a full return on its financial investment in less than eight years.

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 Kirie 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 reducing greenhouse gas emissions, 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 Mount Prospect, it takes four hours to reach Kirie WRP (in dry weather) and about 24 hours to go through the treatment process before it is released as clean water to the Higgins Creek.

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

UPDATED 3/20/19