



## John E. Egan Water Reclamation Plant



Egan Water Reclamation Plant

The John E. Egan 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 Egan WRP serves 160,735 residents in a 44-square-mile-area. In operation since 1975, the Egan WRP cleans an average of 30 million

gallons of wastewater per day (mgd) and has the capacity to treat 50 mgd.

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.

### Wastewater Treatment

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, 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 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.



**The Egan WRP serves 160,735 residents in a 44-square-mile-area in northern Cook County, Illinois.**

**Egan WRP Communities**

Arlington Heights	Palatine
Elk Grove Village	Rolling Meadows
Hoffman Estates	Roselle
Inverness	Schaumburg

**About Egan WRP**

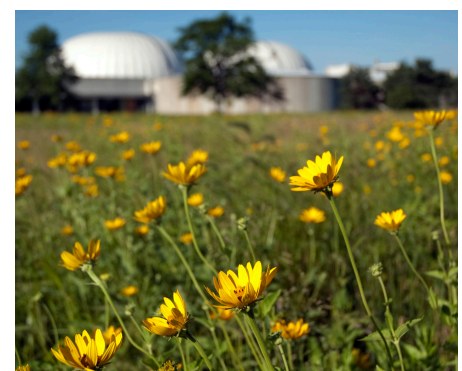
- 550 South Meacham Road Schaumburg, IL 60193
- 75 employees
- 9 buildings on 275.4 acres
- In operation since December 16, 1975

**Receiving Stream**

- Upper Salt Creek

**Treatment Volume**

- 30 million gallons/day (avg.)
- 50 million gallons/day (max.)



Native prairie on the grounds of Egan WRP.

**Tertiary treatment:** Tertiary treatment includes any additional processes used to further clean the water after it passes through secondary treatment, including ultraviolet light disinfection and chemical treatments like chlorination. At Egan, water is disinfected using chlorination and dechlorination, and there are tertiary filters made of dual media of sand and anthracite for further polishing of solids. The clean water is released from the Egan WRP into Upper Salt Creek. It only takes 7.8 hours for wastewater to be transformed from 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.

The 6,300 dry tons of solids removed from wastewater every day at the Egan WRP are transported by truck to MWRD solids management areas for additional treatment and drying. The resulting biosolids are a sustainable alternative to chemical fertilizers that 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.

In an effort to lessen the potential impact of phosphorus and nitrogen on the Des Plaines River, the Egan WRP staff recently selected deammonification technology known as ANITA™ Mox—the first of its kind in Illinois—to add to the plant's tertiary treatment processes. The ANITA™ Mox system will reduce the high concentrations of ammonia from centrate, which is the water remaining after removal of solids. In addition to the benefits of reduced waterway pollutants, the Egan WRP Centrate will no longer need to be piped to the O'Brien WRP for treatment and odors will be reduced.

**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 Egan 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 Palatine, it takes about 5 hours to get to Egan WRP (in dry weather) and about 8 hours to go through the treatment process before it is released as clean water to Upper Salt 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



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