



**Metropolitan Water  
Reclamation District  
of Greater Chicago**

# Work in water as an engineer

## MWRD engineers work to protect waterways and reduce flooding

At the Metropolitan Water Reclamation District of Greater Chicago (MWRD), engineers work to keep our waterways clean, reduce flooding, recover valuable resources and safeguard Lake Michigan. They help communities across Cook County protect residents and businesses from flooding.



Engineers learn how nature works and how engineered systems can complement them. To clean and manage water, understanding how water moves naturally or through human-made structures is essential. This includes knowing where it runs off roads and sidewalks during storms, where it puddles, floods and how to keep waterways pollution-free. It also means knowing about the water cycle processes like evaporation.

Many cities already have systems to manage dirty water (wastewater) and storm runoff. But we can always make these systems better.



*Engineers see a problem, address it, and collaborate to refine every detail to make communities more livable through proper design and data. This critical work ensures safety, functionality and innovation standards are met.*

# Follow the flow of water

Look at the illustration and with the vocabulary list below, identify how the water is moving.

If you see a problem, like flooding, think like an engineer.

Engineers first identify the problem, explore solutions, create possible solutions, then design the best one, try it out and see if they can make it better.



**1. Evaporation:** The process where the sun's energy and other heat sources cause water to change from liquid to water vapor (gas) and enter the atmosphere.

**2. Precipitation:** Precipitation is any liquid or frozen water—rain, snow, or hail—that forms in the atmosphere and falls to Earth.

**3. Transpiration:** Trees and plants pull water up from their roots to their leaves to support photosynthesis. Leaves release water vapor through their pores (stomata) into the air.

**4. Impervious vs permeable surfaces:** Impervious surfaces (roads, roofs) block water, causing runoff/flooding. Permeable surfaces (soil, pavers, native plant gardens) let water soak in.

**5. Native plants:** Native plants have deep, sponge-like roots that soak up rain, reducing flooding and stopping water from rushing into sewer drains.

**6. Runoff/flooding:** In cities, rain hits concrete/roofs (impervious surfaces) and runs off the hard surfaces, sometimes overwhelming sewers, causing floods and basement backups.

**7. Rain barrels:** Rain barrels collect roof runoff, which saves water for gardens, cuts water bills, reduces basement floods, and stops runoff from entering waterways.

**8. Combined sewers:** Combined sewers are old, single pipes that carry both wastewater and rainwater from homes and streets to treatment plants.

**9. Intercepting sewers:** Large pipes that catch sewage from smaller local sewers and flow to wastewater treatment plants instead of rivers to prevent pollution.

**10. Tunnel and Reservoir Plan:** MWRD's "Deep Tunnel" (TARP) is a huge underground system and three vast reservoirs that store sewage and rain to reduce flooding and protect waterways.

## There are many kinds of engineers, including:



**Civil engineers** who design, build and maintain the foundations for our communities like systems for drinking water, wastewater, stormwater, energy and transportation.



**Mechanical engineers** design machines like robotics, engines and medical devices and other solutions to solve problems and challenges.



**Electrical engineers** develop, test and manage the manufacturing of electrical equipment and systems, such as data centers, smartphones and electric motors.



**Structural engineers** design the “bones” of a building, bridge or roller coaster to make sure it can support its own weight, its occupants and natural forces like wind or earthquakes.

All these types of engineers are needed at the MWRD to work on stormwater projects, help keep wastewater treatment plants operating, and innovate technologies used to clean water. MWRD engineers work with technicians, skilled trades workers, and other specialists, along with communities and their leaders. Their goal is always to protect the region’s water environment and public health.

**To learn more about the MWRD, internships and careers, visit [mwrdd.org](http://mwrdd.org).**



*MWRD engineers partnered with Space to Grow to create this unique school yard at Wadsworth Elementary School, in Chicago’s Woodlawn community. Designed to reduce neighborhood flooding, this outdoor space has multiple benefits. Students can play and learn, all ages can gather in a relaxing green environment, and more than 130,000 gallons of rainwater is captured.*