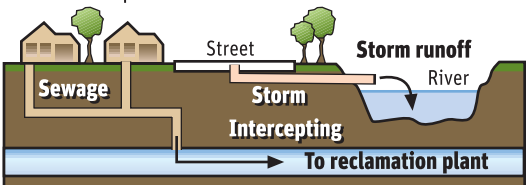


CHICAGO AREA SEWAGE AND STORM WATER DELIVERY SYSTEMS
 There are two types of sewer systems in the Chicago area: **separate sewer systems**, which are newer and mostly outside the city, and **combined sewer systems**, in older parts of Chicago and suburbs.

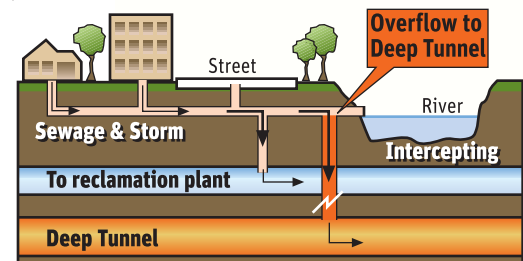
Separate sewer systems

This system has two separate sewers, storm and sanitary. Storm sewers discharge storm water runoff into detention ponds or directly into waterways. Sanitary sewers connect directly with intercepting sewers that take it to reclamation plants for treatment.



Combined sewer systems

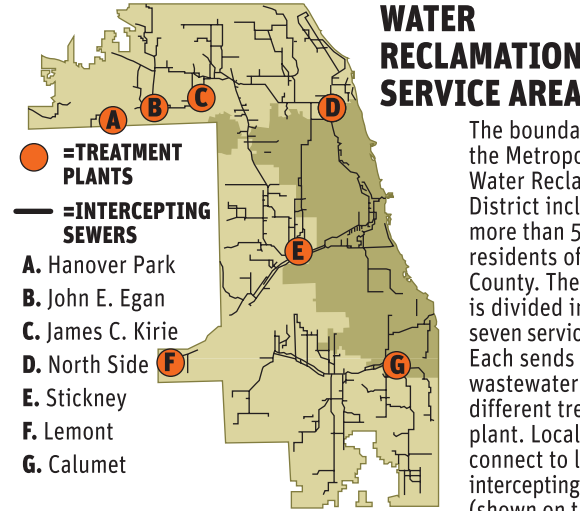
In this system, sanitary sewage and storm runoff flow into the same sewer. They were originally designed to empty raw sewage directly into the river. Larger intercepting sewers were built to take the sewage to reclamation plants. During heavy rainstorms the intercepting sewer can get overwhelmed, causing sewage to flow into the river. A first-of-its-kind "Deep Tunnel" was designed in Chicago to capture the overflow and transport it to the reclamation plant.



Deep Tunnel is approximately 320 feet below the surface and as wide as 33 feet diameter.

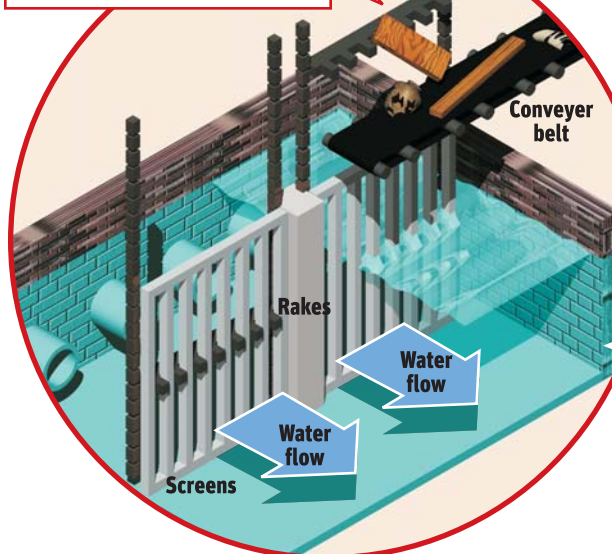
DOWN THE DRAIN
 The Metropolitan Water Reclamation District of Greater Chicago is responsible for cleaning 1.4 billion gallons of wastewater from Cook County residents and businesses each day. The district is divided into seven service areas, each with a reclamation plant. The plant mimics the purification process that occurs naturally in rivers, condensing what would take one or two weeks to just under 8 hours. Here is a look at how this is achieved.

SUN-TIMES GRAPHIC BY GREG GOOD



The boundaries of the Metropolitan Water Reclamation District include more than 5 million residents of Cook County. The district is divided into seven service areas. Each sends wastewater to a different treatment plant. Local sewers connect to large intercepting sewers. (shown on the map)

Rakes comb through screens to remove trash. The large trash is deposited on conveyor belts and taken to the landfill.

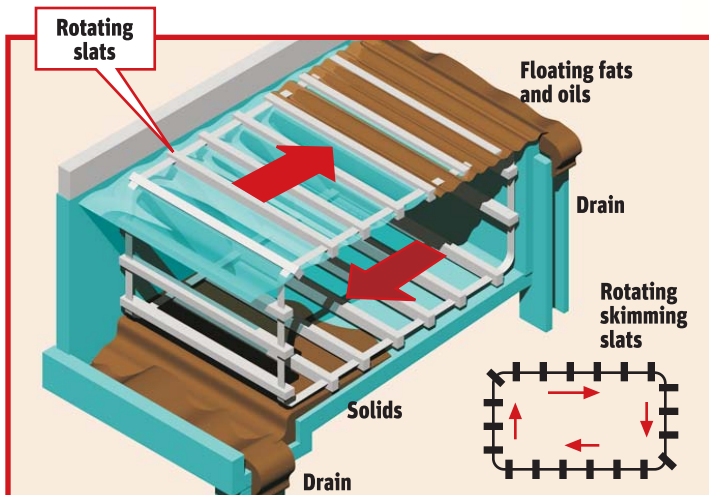
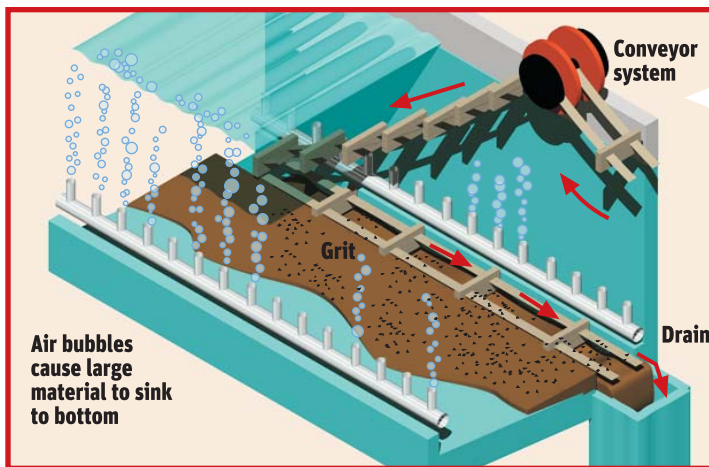


2 COARSE SCREENS (Preliminary treatment)

Screens remove large objects – trash, wood, etc. – that could damage pumps.

3 AERATED GRIT TANKS (Preliminary treatment)

These use air bubbles keep lighter materials suspended while grit, sand and gravel sink to the bottom. Once the large material is on the bottom, a conveyor scrapes it into a drain. What is collected is taken to a landfill.

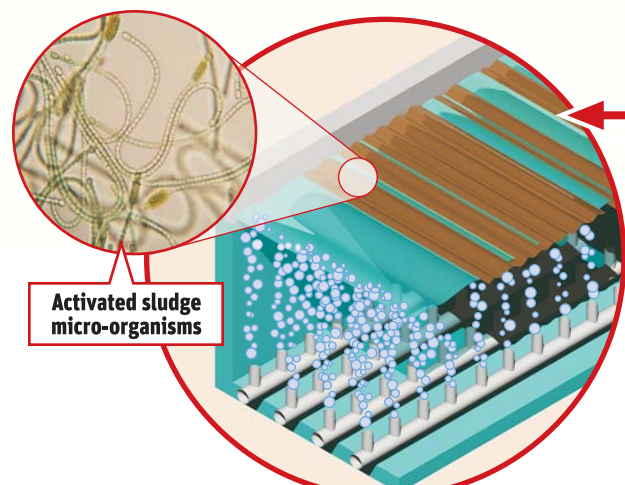


4 PRIMARY SETTLING TANKS (Primary treatment)

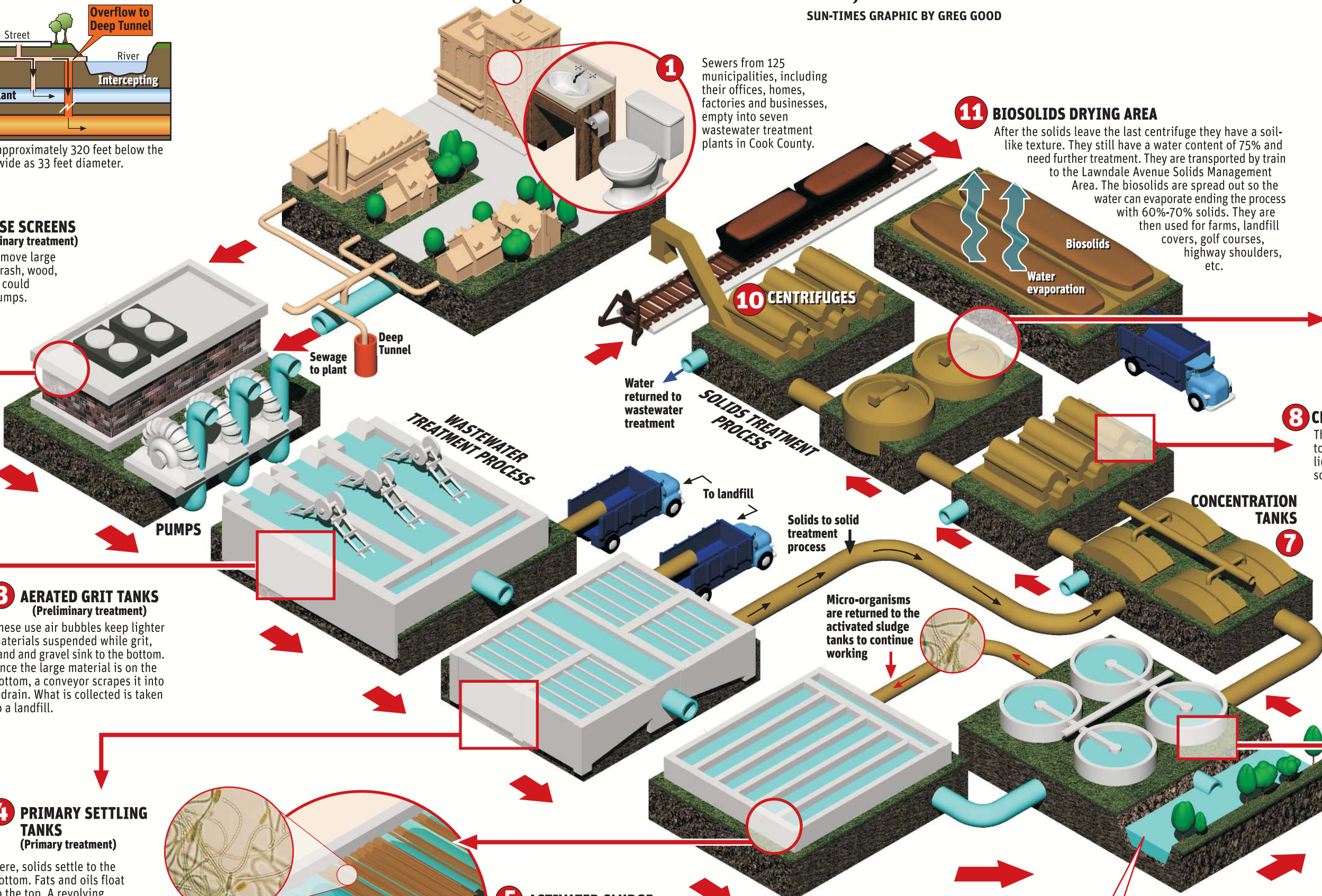
Here, solids settle to the bottom. Fats and oils float to the top. A revolving conveyor with slats skim off the floating fats and oils and sends them to a drain and on to the landfill. Those same slats rotate to the bottom and push the solids to a drain that takes it to the solids treatment process.

5 ACTIVATED SLUDGE AERATION TANKS (Secondary treatment)

Air is pumped into a carefully maintained population of micro-organisms. These organisms break down the remaining suspended solids and help them settle in the final settling tank. A portion of the settled solids containing the micro-organisms is returned to the aeration tank to continue working.



1 Sewers from 125 municipalities, including their offices, homes, factories and businesses, empty into seven wastewater treatment plants in Cook County.

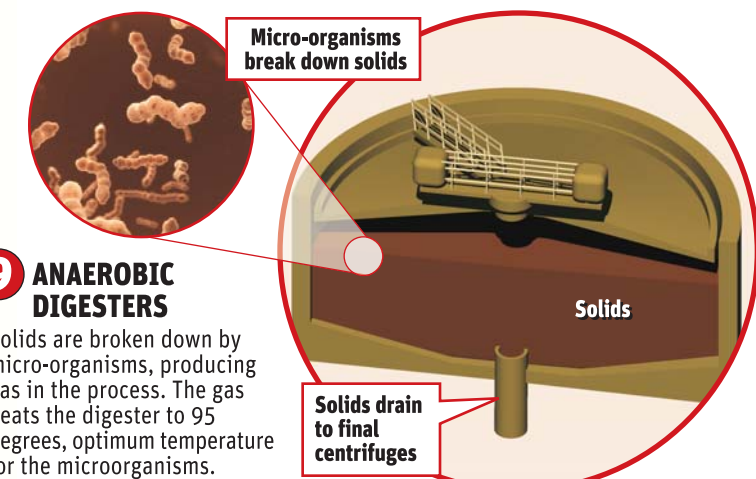


11 BIOSOLIDS DRYING AREA

After the solids leave the last centrifuge they have a soil-like texture. They still have a water content of 75% and need further treatment. They are transported by train to the Lawndale Avenue Solids Management Area. The biosolids are spread out so the water can evaporate ending the process with 60%-70% solids. They are then used for farms, landfill covers, golf courses, highway shoulders, etc.

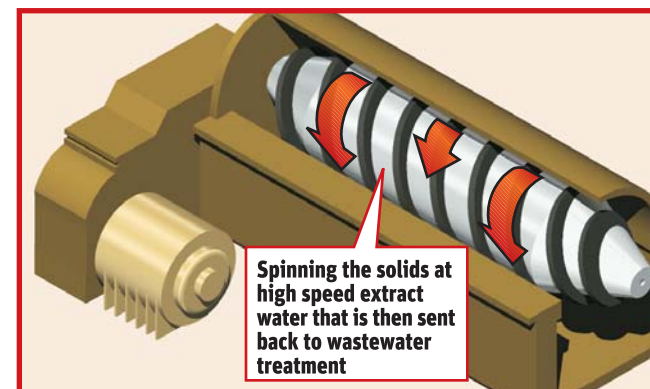
9 ANAEROBIC DIGESTERS

Solids are broken down by micro-organisms, producing gas in the process. The gas heats the digester to 95 degrees, optimum temperature for the microorganisms.



8 CENTRIFUGES

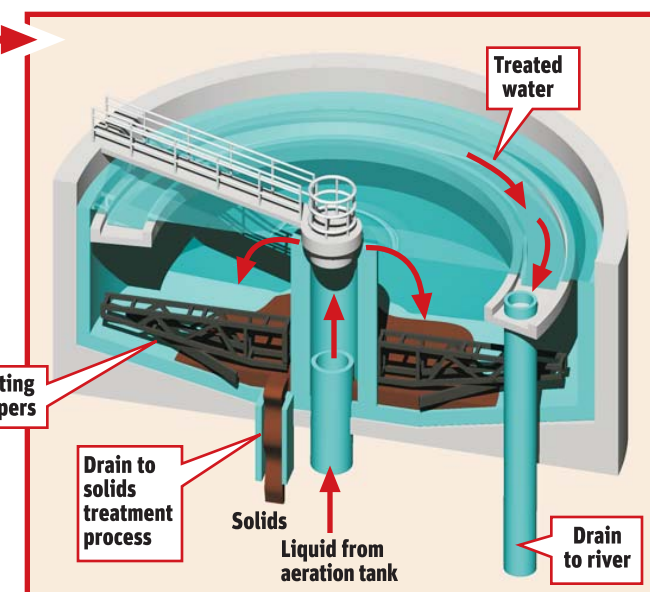
They rapidly spin to extract more liquid from the solids.



7 CONCENTRATION TANKS

6 FINAL SETTLING TANKS (Last of the wastewater treatment)

Liquid from aeration tanks is pumped up through the center of the tank. Solids sink to the bottom where revolving blades scrape them into a drain sending it to the concentration tanks. Treated wastewater flows to the top of the tank to a drain and is sent to a canal or river.



Graphic is schematic. Not to scale
CHICAGO SUN-TIMES

At the end of the wastewater treatment process the water returns to the river. The reclaimed water has more than 95% of the impurities removed. This "effluent" is often cleaner than the water in the river or canal.

SOURCE: Justin Brown, Reed Dring, Metropolitan Water Reclamation District of Greater Chicago