



Tunnel and Reservoir Plan (TARP)



Thornton Reservoir, part of the Calumet TARP system, during excavation.

The Tunnel and Reservoir Plan (TARP), also known as “Deep Tunnel,” is a system of deep, large-diameter tunnels and vast reservoirs designed to reduce flooding, improve water quality in Chicago area waterways and protect Lake Michigan from pollution caused by sewer overflows. TARP captures and stores combined stormwater and sewage that would otherwise overflow from sewers into waterways in rainy weather. This stored water is pumped from TARP to water reclamation plants (WRPs) to be cleaned before being released to waterways. The four TARP tunnel systems are designed to flow to three huge reservoirs, and the system will have a capacity of 17.5 billion gallons when complete. That is over 4,666 gallons for each person in its service area. One of the largest civil engineering projects on earth, TARP has been extremely effective and widely emulated since the initial tunnels went online in 1981.

The Challenge: Combined Sewer Overflows

Like many older cities, Chicago has a combined sewer system in which sanitary sewage from homes, offices and industries drains into the same pipes as stormwater. Most of these combined sewers were built before wastewater treatment existed and were designed to drain directly into rivers. In the early 20th century, the Metropolitan Water Reclamation District of Greater Chicago (MWRD) built large intercepting

sewers to redirect sewers to newly built WRPs to clean the water. This system works well in dry weather, but in heavy rains, the intercepting sewers and WRPs can reach capacity, resulting in combined sewer overflows (CSOs) to the river, impairing water quality and contributing to flooding.

Planning TARP

As development spread through the Chicago area in the early 20th century, paved surfaces directed increasing amounts of stormwater runoff into the combined sewer system. By the 1960s, Chicago area sewers overflowed to the river more than 100 days a year, and flooding had become a persistent issue. In 1967, officials of the MWRD, the state of Illinois, Cook County and the city of Chicago formed the Flood Control Coordinating Committee to find a solution to the region’s flooding and water pollution problems caused by combined sewer overflows. The committee considered 50 alternatives and selected TARP as the most cost-effective approach to providing maximum benefits with minimal negative impacts. The most obvious solution, replacing combined sewers with separate storm and sanitary pipes, was determined to be too costly, disruptive to communities, and unable to provide flood relief. The MWRD officially adopted TARP as the area’s plan to comply with federal and state water quality standards in 1972.

Construction and Status

TARP tunnel construction began in 1975. Construction was planned so that completed portions of the system could be put into operation as work continued elsewhere. The scale and depth of the project were unlike anything previously undertaken and required innovative approaches to tunneling. Newly-developed tunnel boring machines were used instead of traditional blasting to minimize vibrations, expedite progress, reduce damage to surrounding rock and lower costs for long sections of tunnels. To protect groundwater from leakage and protect

TARP Overall

- 17.5 billion gallons (BG) of combined sewer capacity
- 110 miles of tunnels, 2.3 BG capacity
- Three reservoirs, 15.15 BG capacity
- 360 square mile service area
- 3.71 million people within service area
- Phase 1 (Tunnels) completed 2006
- Phase 2 (Reservoirs) under construction

Upper Des Plaines Tunnel System and Majewski Reservoir

- **Service area:** 11 square miles
- **Tunnels:** 0.07 BG capacity, 6.6 miles
- **Gloria Alitto Majewski Reservoir:** 0.35 BG capacity

Benefiting Communities:

Arlington Heights Mount Prospect
Des Plaines

Des Plaines Tunnel System

- **Service Area:** 35 square miles
- **Tunnels:** 0.4 BG capacity, 25.6 miles
- **Reservoir:** McCook Reservoir

Mainstream Tunnel System

- **Service Area:** 223 square miles
- **Tunnels:** 1.2 BG capacity, 40.5 miles
- **Reservoir:** McCook Reservoir

McCook Reservoir

- **Capacity:** 10 BG
- **Service Area:** 258 square miles
- **Tunnel Systems:** Mainstream and Des Plaines
- **Capacity breakdown:** Stage 1, (3.5 BG); Stage 2 (6.5 BG)

Benefiting Communities:

| | |
|-----------------|-----------------|
| Bedford Park | Lyons |
| Berwyn | Maywood |
| Broadview | Melrose Park |
| Brookfield | Morton Grove |
| Chicago | Niles |
| Cicero | Norridge |
| Des Plaines | North Riverside |
| Elmwood Park | Oak Park |
| Evanston | Park Ridge |
| Forest Park | River Forest |
| Forest View | River Grove |
| Franklin Park | Riverside |
| Golf | Schiller Park |
| Harwood Heights | Skokie |
| Hometown | Stickney |
| Kenilworth | Summit |
| La Grange | Western Springs |
| La Grange Park | Wilmette |
| Lincolnwood | |

Calumet Tunnel System and Thornton Reservoir

- **Service area:** 91 square miles
- **Tunnels:** 0.63 BG capacity, 36.7 miles
- **Thornton Reservoir:** 4.8 BG capacity

Benefiting Communities:

| | | |
|--------------|---------|---------------|
| Blue Island | Dixmoor | Phoenix |
| Burnham | Dolton | Posen |
| Calumet City | Harvey | Riverdale |
| Calumet Park | Lansing | South Holland |
| Chicago | Markham | |

the tunnels from water infiltration, cracks in the limestone were sealed with grout and the tunnels were lined with concrete. The Upper Des Plaines Tunnel System, located near O'Hare Airport, went online in 1981, and the entire tunnel system was operational in 2006.

The smallest of the TARP reservoirs, Gloria Alitto Majewski Reservoir, was completed in 1998. Thornton Reservoir was completed in 2015 and now provides 3.1 billion gallons of

additional storage to reduce overbank flooding from nearby Thorn Creek. The first stage of McCook Reservoir went online in 2017, and excavation is underway on stage 2. Partnering with commercial quarries for excavation has allowed these huge reservoirs to be completed economically and efficiently.

Benefits

TARP has been extremely successful in preventing flooding and pollution caused by combined sewer overflows. Since the tunnels became operational, CSOs have been reduced from an average of 100 days per year to 50. Since Thornton Reservoir came online in 2015, CSOs have been nearly eliminated in its service area. As water quality has improved, our waterways have become home to increasingly healthy and diverse fish populations and popular destinations for recreation. Other cities around the world have taken note of TARP's success and are now undertaking similar deep tunnel projects.

TARP Tunnels and Reservoirs



Construction at the confluence of the McCook Reservoir Connecting Tunnel (left) and Mainstream Tunnel (right)

