Storm Water Management in the City of Chicago

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Abstract

The City of Chicago owes its very existence to its location at the confluence of the Chicago River and Lake Michigan. Lake Michigan provides the City with an abundant water supply while the Chicago River serves as a highway to move goods

District of Greater Chicago) started construction of a large scale, multi-purpose Tunnel and Reservoir Program (TARP), comprised of deep rock tunnels and surface reservoirs that capture, convey, and store combined sewage during storms until it can be transferred to existing treatment plants when capacity becomes available.

In 1974, prior to TARP, only 10 fish species were found in the Calumet and Chicago River systems. With improvements in wastewater treatment technology, the species count rose to 33 by the early 1980s. In 1984, the first TARP tunnel projects came online, reducing the frequency and volume of combined sewer overflows. Subsequently, the species count rose gradually to 54 by 1990, and had reached 63 by 2000. This steady climb over the years is due in part to additional segments of the TARP tunnels coming online, further improvements in treatment plant performance, and supplemental aeration of the waterways (EPA Region V, 2002).

Today, increased residential and commercial development is ocurring along the banks of Chicago waterways. The waterways are no longer considered just navigational canals, but are seen to be amenities or center pieces of urban life. The public's interest in the river has grown, as evidenced by the increasing numbers of paddlers, walkers, bikers, and even jet skiers on the river. Fishing on the river has also grown in popularity. Fish consumption advisories still remain in place, however, and large portions of the rivers are not safe for full body contact. Additional work remains to be done.

Current Storm Water Management Approach

The City is taking a new comprehensive approach toward further improving the quality of its surface waters. Rather than through large scale engineering projects, the approach centers on implementing and promoting demonstration projects that utilize simple storm water Best Management Practices (BMPs) at the source level. The goals of these BMPs are to reduce the quantity and improve the quality of urban storm water runoff.

Common Storm Water BMP Techniques

Storm water pollutants includes such substances as solids, metals, oil and greases, and road salt. BMPs commonly employed in Chicago's model projects to treat storm water runoff include vegetated swales, infiltration trenches or basins, detention basins, mechanical filtration/sediment and oil grease traps, roof top gardens, and cisterns that capture runoff for gray water use. A brief description of some of these BMPs are described below.

Vegetated Swales - In vegetated swale designs, storm water is conveyed through a vegetated swale instead of a storm sewer. Swales increase storm water infiltration potential and storage. Swales also remove pollutants via settling, vegetative filtering, and to some extent infiltration through the soil. Sediments need to be periodically removed from vegetated swales, and the vegetation mowed and replanted as needed (NIPC 1995).

Infiltration Trench or Basin - In an infiltration trench or basin, storm water runs through a swale or into a basin that has a porous bottom (sand or gravel), causing storm water to infiltrate into the ground. As the storm water percolates through the ground, contaminated particles are trapped within the soil and the

resulting treated water migrates to the groundwater. Water quality benefits are derived from the removal of contaminants that are sorbed onto soil particles and decreased flows into the river. Sediment will tend to clog systems unless the systems are routinely maintained. The condition of the trench should be periodically checked and the accumulated sediment removed. After years of operation, th

development of prototypical guidelines and specifications that can be used elsewhere, and conduction of a study quantifying the environmental benefits of green roof systems.

The swales will empty into vegetated detention basins for treatment, then be conveyed to a wetlands area and finally into Indian Creek. This design will slow the pace of movement of water into the creek, removing harmful contaminants and decreasing the erosion often caused by major storm events. The entire campus will be planted with shortgrass prairie, tallgrass prairie, and native trees.

Public Infrastructure Projects

130th and Torrence Intersection - The City is reconstructing the intersection of 130th and Torrence Avenue. As part of this project, both streets will be depressed. Storm water from a rain event will be collected in an underground chamber and then pumped to the Calumet River. The City is considering a variety of treatment options for the storm water before its discharge to the river. These options involve selecting the right combination of BMPs in series that will treat the runoff most effectively and at the least cost. The options

reducing polluted run-off and flooding. The system is suitable for traffic, including residential and service vehicles.

Rain Blocker Program - Rain Blocker is Chicago's program of installing "vortex" type restrictors in sewer