Turning Vacant Land into Green Infrastructure, Cleveland, Ohio

EPA Region 5 is working with the City of Cleveland to approach brownfields cleanup and reuse in ways that recognize the important role that land revitalization can play in addressing a host of environmental challenges. By building green infrastructure on underutilized parcels in the city, Cleveland can reduce stormwater runoff and combined sewer overflow discharges while reducing the amount of vacant property and creating greenspace and public amenities that contribute to neighborhood revitalization.

Site after demolition does not support plants

Cleveland is one of about 772 cities in the U.S. that have combined sewer systems with only one set of sewer pipes that handle both wastewater and stormwater. These combined sewer systems can convey wastewater and stormwater to area treatment plants in dry weather, but during rain events there is too much volume for the sewers to handle. The sewers overflow, releasing a mixture of stormwater and untreated wastewater into receiving waters. These discharges, called combined sewer overflows (CSOs), are a major water pollution concern for these cities. Even in cities with separate sewer pipes for wastewater and stormwater, the large volumes of stormwater and pollutants being discharged during wet weather events can have substantial adverse effects on lakes, rivers, streams, and wetlands.

Cleveland's Project Clean Lake

In late 2010, EPA, the U.S. Department of Justice, and the Northeast Ohio Regional Sewer District (NEORSD) agreed on a plan to address the flow of untreated sewage into Cleveland area waterways and Lake Erie by capturing and treating more than 98 percent of wet weather flows entering the combined sewer system servicing Cleveland and 59 adjoining communities.

Project Clean Lake is a $3 billion, 25-year plan. As part of this plan, the sewer district will invest at least $42 million in green infrastructure projects. Under Project Clean Lake, NEORSD will reuse brownfields and vacant properties for green infrastructure, which is expected to assist in the revitalization of targeted urban neighborhoods. The sewer district will work with the Cleveland and Cuyahoga County land banks to transform the area's numerous vacant or abandoned properties to runoff-control landscape uses. The sewer district will collaborate with governments and local community groups to select the locations and types of green infrastructure projects.

Preparing Urban Soils for Green Redevelopment

The Bellaire Puritas Development Corporation undertook a project in 2010 to implement green infrastructure at a vacant parcel located at West 131st Street in Cleveland. Water levels in the adjacent Chevy Branch stream increase dramatically during and after rain events due to runoff from impervious surfaces in the area.

Green infrastructure was seen as a beneficial reuse at this location because retaining and infiltrating stormwater helps to reduce the volume of water in the stream and the associated adverse water quality impacts. The home and driveway previously on this site had been demolished. Testing of soil conditions

by EPA's Office of Research and Development found soils compacted and poorly suited for infiltrating stormwater or growing plants. Low levels of lead also were found in the soils.

Restoration activities included physically loosening the soil, removing debris, grading to create a swale, excavation to create a rain garden, and amending the soil with a mix of compost, sand, and topsoil. The rain garden and swale will retain runoff from the drainage area and reduce localized flooding in the area. The soil amendments will allow planting of the rain garden and swale with native plants and broadcast seeding of the remaining portions of the site using native grasses and flowering plants.

The restoration work was done by a private contractor and cost approximately $13,500. Signage was installed with information on the Chevy Branch, native plants, and green infrastructure. This formerly vacant parcel will soon be a productive and educational green space that helps to protect the surrounding residential area from flooding.

Partners in this project are community members, Neighborhood Progress Inc., ParkWorks, Inc., Cuyahoga County Soil and Water Conservation District, Ohio State University, the Northeast Ohio Regional Sewer District, and EPA. Funding for this project was provided by NEORSD and NPI.