

With approximately 1,900 miles of public alleys, Chicago has one of the most extensive and important pieces of infrastructure of any city in the world. Originally unpaved, most had no drainage structures or connection to the sewer system, leaving rainwater to simply drain through surfacing. Decades ago, the City of Chicago paved over the alleys with traditional concrete or asphalt, covering 3,500 acres with an impermeable surface. Stormwater drained by simply pitching the alley grades toward the center of the alley, and then to the street where water could enter the city's shared storm and sewer system. However, the surfaces and grading of many alleys have deteriorated throughout the years, and as a result, localized flooding has become a problem.

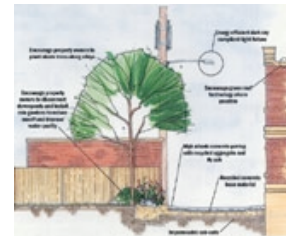
On the forefront of sustainable design in urban neighborhoods, the City of Chicago has developed The Chicago Green Alley Program, promoting best practices in stormwater management within public alleyways. The program addresses drainage issues head-on without incurring additional costly sewer infrastructure improvements.

Through the integration of different sustainable building components including permeable paving, recycled materials, reflective pavements and energy-efficient lighting, the program will reduce the amount of stormwater runoff into the storm sewer system by up to 80 percent, reduce localized flooding of adjacent properties and help reduce the urban heat island effect.

The City of Chicago Department of Transportation (CDOT) worked with the project team of Hitchcock Design Group, Knight E/A, Inc., and Hey and Associates, Inc., to develop four pilot approaches for future alleyway improvements.

The four pilot approaches are:

#1: Green Pavement Materials with Conventional Drainage: a properly graded and pitched alley surface directs stormwater towards the center of the alley, into adjacent streets and finally into the existing sewer system. Optional inlet structures connected to underground drainpipe assist the system during heavy rain.



Section of Green Alley

#2: Full Alley Infiltration Using Permeable Pavement: the entire alley surface integrates [permeable pavement](#) materials such as permeable concrete.

#3: Center Alley Infiltration Using Permeable Pavement: the alley way is pitched to direct stormwater towards permeable pavement materials at the center of the alley. Optional inlet structures connected to under drain pipe assist the system during heavy rain.

#4: Green Pavement Materials with Subsoil Filtration System: the concrete alley way is pitched to inlet structures with perforated sides which allow stormwater to seep into an infiltration trench.

All of the approaches incorporate concrete as a sustainable building material. Of particular important, where soil conditions are appropriate, water is allowed to infiltrate into the soils through permeable pavement or infiltration basins instead of being directed into the sewer system or onto adjacent property. This not only solves a persistent problem, it provides an environmental benefit by cleaning and recharging the ground water.

According to Project Team Member Sarah Gephart with Hitchcock Design Group, concrete was chosen as a component to the green alley pilot approaches not only because of its durability as a construction material, but also because of its ability to take on many environmentally sustainable properties.

"Light colored concrete (with a high albedo rating) reflects sunlight thereby reducing the urban heat island effect," said Gephart. "Plus, recycled materials such as recycled aggregate and slag can be incorporated into concrete mix while reducing the amount of waste hauled to landfills."

Gephart also noted that recycled concrete could be used as a structural base, again reducing the amount of waste hauled to landfills. Permeable concrete allows stormwater runoff to percolate into the subgrade reducing the stormwater load bore by the City's sewer system. Permeable concrete can sometimes reduce erosion caused by stormwater runoff.

In the fall of 2006, the team executed each pilot approach in various neighborhoods. Based on a set of site criteria developed by CDOT and the project team that includes permeability of the existing subgrade, adjacent property use and available funding, one approach will be consistently implemented in the future. The city has implemented more than 40 green alleys as of Spring 2008. By the end of 2008, officials anticipate that there will be 10 more green alleys in the city.

"Infrastructure represents a long-term investment on the part of the Chicago," says Janet Attarian, project director for the CDOT Division of Project Development and Sustainability Coordinator for the Department. "How we design and build that infrastructure will have a lasting impact. Inefficient infrastructure which does not promote healthy lifestyle choices or a high quality of life will be a burden on the city for many years to come."



Alley prior to improvements

"Furthermore, large cities such as Chicago compete on a global playing field. Infrastructure that does not address climate change will become an increasing liability over time, fail to promote social

prosperity, and may hinder economic development,” added Attarian who also serves as sustainability coordinator for CDOT.

The City of Chicago capitalized on this opportunity to bolster their on-going efforts to create an eco-friendly urban environment. While another municipality might have chosen to implement a similar program simply to resolve only the stormwater issues, the city has taken a holistic approach and is integrating recommendations for adjacent property improvements. Understanding that public buy-in is critical to the successful implementation, the city is focused on educating the public about the benefits of the program and how they can contribute to the greening of Chicago.

The program and the accompanying handbook have received local and national recognition from like-minded professional associations including the American Society of Landscape Architects (ASLA), American Planning Association Illinois Chapter (APA-IL), Illinois Chapter ASLA and the Chicago Innovation Awards Program. Recent inquiries from places as far away as Italy are demonstrating the universal appeal of the program’s sustainable principles and their transferability on an international scale.

“We have had a tremendous response to the program, from all over the country and beyond. It has been wonderful to speak with cities all over who have been inspired to start their own green alley program because of what we have done here in Chicago,” says Attarian. “We are particularly excited about cities in the greater Chicago region who have expressed interest, as we hope to grow the market locally and develop the whole region as an incubator of sustainable design.”

For further information on the Green Alley Program, or to download a copy of the handbook, visit [www.cityofchicago.org/transportation](http://www.cityofchicago.org/transportation).

#### **Project Team:**

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*Alley with permeable pavement*