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Greener Alleys

by Janet L. Attarian

Chicago shares insights on use of permeable pavements and other eco-friendly strategies to create more sustainable transportation infrastructure.

Photo: CDOT.

Photo: CDOT

(Above) As part of a pilot project by the Chicago Department of Transportation's Green Alleys program, this paving crew is using a roller to compact a permeable asphalt pavement placed in an alley in the Beverly neighborhood of Chicago. (Bottom) The completed pavement is shown 2.5 years after installation.

Water, in its many forms -- rain, snow, ice -- is a traditional enemy of roads and bridges. From pooling and icing to frost heaves and corrosion, water causes myriad challenges for departments of transportation. In response, road managers employ design and management strategies to move water off and away from paved surfaces as quickly and efficiently as possible.

In Chicago, IL, the public right-of-way includes more than 3,775 miles (6,075 kilometers) of streets and 1,900 miles (3,058 kilometers) of alleys. Representing roughly one-quarter of the city's land area, streets and alleys make a significant contribution to urban runoff. An overabundance of nonporous surfaces, such as pavements and buildings, can exacerbate localized flooding and lead to overflows into natural water bodies from any sewers that are combined with storm drains. Overflows occur when the volume of wastewater exceeds the capacity of the sewer system or treatment plant, causing discharge of rainwater runoff, domestic sewage, and industrial wastewater into nearby bodies of water.

Most of Chicago's alleys do not have sewer infrastructure. They were designed to divert stormwater toward the center of the alleys and then out into the streets, where the water enters the combined sewer system through catch basins. Over the last 100-plus years, however, many of these alleys deteriorated, or their flowlines changed or were interrupted. According to David Leopold, project manager of the Chicago Department of Transportation's (CDOT) Streetscape and Sustainable Design Program, this leads to frequent requests from aldermen, property owners, and businesses to address flooding. Until recently, he says "the typical response was to either resurface or reconstruct the alley, usually adding a sewer and catch basin."

CDOT

CDOT reconstructed this alley in the Andersonville neighborhood using pervious pavers, a solution that helps reduce urban runoff and prevent localized flooding.

But in 2004, CDOT began looking at the flooding problem differently. The department wanted to expand the available solutions and offer more sustainable options. Toward that end, CDOT launched a pilot project to test three permeable pavements: pervious concrete, pervious asphalt, and porous pavers. The pilot entailed developing prototype alley designs, formulating and testing new pavement materials, and working with staff and contractors on new construction techniques and quality assurance and control.

The lessons learned prompted additional pilots, and now the city is reshaping the way it designs alleys and applying this knowledge to larger projects, including parking lots and streets. With its new Green Alleys program and a public outreach document, *The Chicago Green Alley Handbook*, CDOT is expanding its toolkit of pavement solutions and leading the city toward a more sustainable future.

CDOT

CDOT

(Top) Prior to reconstruction, this alley experienced frequent flooding, as shown here with snowmelt leaving large pools of standing water. (Bottom) After reconstruction with porous pavers in 2006, the alley no longer retains water.

Pervious Pavements

Before embarking on the pilot project, CDOT staff and consultants, suppliers, and contractors had limited or no previous experience with permeable pavements. "Local producers and contractors saw no need to research and develop [pervious] mix designs," says Cindy Williams, CDOT's quality assurance manager. "The Illinois Department of Transportation [IDOT] did not have specifications for the production or placement of such materials and, therefore, quality control and quality assurance guidelines did not exist either. Development of mix designs and testing procedures by CDOT was critical to be able to define and specify what was needed."

To overcome this obstacle, the department led an aggressive design and investigative process that involved collecting best practices and sample specifications from around the country. CDOT developed its own specifications through a collaborative process involving CDOT staff, the design team, and a materials testing consultant. Together, they established a series of goals, tested the ideas in a laboratory, and then reviewed the results until the final mix designs, materials, and methods were solidified. For both pervious concrete and asphalt, the testing focused on finding the right balance between strength and permeability, given the composition and unit weights of local aggregates.

The department set several overall design criteria for the two materials. In addition to being permeable, the new pavements would need to contain recycled content. Because the end use would be alley applications, the pavements would need to handle average daily traffic consisting of 200 passenger vehicles, 2 single-unit trucks, and 1 multiunit truck. Plus, the pavements would need to incorporate materials available to contractors in the Chicago area and adhere to relevant IDOT specifications.

In addition, the mix designs for the pervious portland cement concrete (PCC) would need to have high albedo (reflectivity) to minimize the urban heat island effect. They would require a unit weight between 110 and 125 pounds per cubic foot (1,762 and 2,002 kilograms per cubic meter) and a 28-day compressive strength of 1,700 pounds per square inch, psi (11,720 kilopascals, kPa). Typically, CDOT uses a 14-day compressive strength of 3,500 psi (24,132 kPa) and a unit weight of 150 pounds per cubic foot (2,403 kilograms per cubic meter) for streets. With the large amount of air voids and reduced fines required to achieve pervious pavement mix designs, lower weights and strengths are usually specified, and 1,700 psi (11,720 kPa) appeared to be a reasonable goal based on the literature review.

For the pervious hot-mix asphalt (HMA), the mix designs would need to have stability comparable to the Superpave® N50 design. A product of the Strategic Highway Research Program, Superpave predicts the performance for various combinations of asphalt binder and mineral aggregates in HMA. Based on the literature review, CDOT determined that the criteria for N50 appeared to be appropriate for pervious HMA given the anticipated loading and expected durability.

PCC is usually designed with only a few percent entrained air voids, which helps increase freeze-thaw resistance, a major concern in the development and longevity of these materials in the climate of the Upper Midwest. For the pervious PCC, however, CDOT is designing for as much as 20 percent interconnected air voids. Similarly, the pervious HMA could include as much as 25 percent air voids.

CDOT

A maintenance worker is using a broom-only streetsweeper to clean the center trench in this alley paved with pervious concrete.

"The downside of the extra void space in the pervious PCC, however, is reduced strength," Williams says. In the research phase, CDOT developed several mix designs, all incorporating ground granulated blast furnace slag, air entrainment, and a water-reducing admixture. Two mixes met the design criteria, one with a predominantly smaller aggregate (about 0.75-inch, or 1.9-centimeter, crushed, washed stone) and one with a predominantly larger aggregate (about 1-inch, or 2.54-centimeter, crushed, washed stone). Although the larger aggregate provided slightly greater strength, the smaller aggregate produced a lower unit weight, and CDOT decided to go with the latter design because of its more uniform appearance and to address concerns about public acceptance.

The pervious HMA, like the PCC, contains little or no sand. To compensate, pervious HMA often contains polymer-modified asphalt cement (AC) and fibers to prevent drain-down. Although the research team did develop a successful mix design with these additives, using an AC modified with recycled ground tire rubber proved much more cost effective, and "to the best of our knowledge, represented the first time a pervious asphalt mix design contained ground tire rubber," Leopold says. This switch solved the drain-down problem without the use of fibers, which are expensive to purchase and blow into the mix. The liquid ground tire rubber enhances the ability of the AC to adhere to the aggregate matrix, saves money, incorporates a recycled material, and increases the temperature range under which the pavement can resist rutting and thermal cracking.

In terms of the porous pavers, at the time of the pilot, CDOT had little experience using these. The pavers themselves are manufactured from an impermeable, high-density, high-strength concrete. Openings between the pavers are filled with an open-graded aggregate, usually a 0.25-inch (0.6-centimeter) crushed and washed stone, to allow water to infiltrate into the setting bed and soil below. The green alley pilots used 3.15-inch (8-centimeter)-deep L-shaped pavers, 10.24 inches (26 centimeters) by 10.24 inches (26 centimeters) wide, with 0.47-inch (12-millimeter) open joints. The pavers use lugs on the sides to maintain the proper spacing and, along with the interlocking "L" shapes, to help provide lateral stability, because the friction of a tight sand joint is not present.

Pilot Projects

After developing the mix designs, in 2006, CDOT launched five pilot projects at selected alleys that experienced flooding and required reconstruction. The original designs for the five pilot alleys all had reverse crowns (meaning water would flow toward the center of the alley) to provide positive flow if clogging occurred. The pilots featured the following characteristics:

- An alley paved in full width and length with pervious PCC.
- An alley paved in full width and length with pervious HMA.
- An alley paved in full width and length with porous pavers and a high-albedo PCC collar.
- An alley paved in full width and length with nonpervious high-albedo PCC.
- A 4-foot (1.2-meter)-wide pervious PCC trench paved along the entire length of the centerline with nonpervious high-albedo PCC in the wheel paths. (The researchers used the center trench design to address urban conditions where infiltration needs to be set back from adjacent buildings to prevent water damage.)

All the alleys had 12 inches (30.5 centimeters) of class A, washed, open-graded aggregate (both crushed and uncrushed were tested) beneath them, except for the alley with the center trench, which had 5 feet (1.5 meters) of aggregate below the trench, with the sides lined in a waterproof membrane.

The pilots revealed a number of lessons in the development and installation of the pervious pavements. For example, with the pervious HMA, the researchers learned that a blend of at least two aggregate gradations should be required for plant control. Also, the addition of fibers is unnecessary if using ground tire rubber. The researchers also found that no more than two lifts (asphalt layers) should be placed in a single production day to avoid causing deformation due to rolling too quickly.

On the pervious PCC alleys, CDOT officials determined that hydration stabilization additives work better than water-reducing and water-retarding admixtures (and this switch was made prior to construction) and that a minimum 28-day compressive strength of 2,000 psi (13,790 kPa) could be achieved and specified. They also found that creating an inverted profile (where the low point of the cross section is in the center of the street) was challenging, as was achieving consistent compaction throughout the specified 8-inch (20.3-centimeter)-thick pavement cross section, particularly within the confines of an alley.

Porous pavers could be installed relatively quickly with mechanical installation, which also helped reduce labor costs. However, achieving an inverted crown with porous pavers presented some challenges.

The breakthroughs and successes from these pilots provided an immediate increase in the department's confidence in pervious pavements. Initial doubts were replaced by well-tested specifications and on-the-ground examples.

According to Leopold, the change brought about within the industry was equally transformative. Although suppliers originally expressed skepticism, after the pilots, many began developing their own mix designs and instituting training classes. Contractors too, Leopold says, went from wary at first to willing to try new techniques.

"All of these changes enabled CDOT to add the newly developed materials to a term contract for alley reconstruction that was going out for public bid in early 2007," Leopold says. "The city received several competitive bids, saw a drop in cost for many of the items, and in one stroke turned an innovative pilot into a program."

Since then, every alley CDOT has reconstructed has been a green alley, using one or more of the materials tested in the original five pilots.

Green Alley Handbook

To help ensure public acceptance of the new approach, CDOT developed *The Chicago Green Alley Handbook*. The handbook is a primer explaining how the department defines a green alley, how a green alley works, and why the city is implementing these new designs. The document clearly explains the toolkit of techniques used in designing green alleys, including proper pitching and grading, permeable pavements, high-albedo pavements, and recycled construction materials. Also explained is another component of the green alley program: dark sky-compliant lighting fixtures, which are designed to direct light downward, reducing light pollution.

"[The handbook] explains the green alley pilot approaches to design as well as dos and don'ts for adjacent property owners," Leopold says. "It lays out a series of best management practices that adjacent owners can implement to further enhance the performance of their green alleys and help make Chicago a greener and more sustainable place." For example, the owners can use rain barrels, rain gardens, and green roofs to help reduce runoff from their buildings.

CDOT distributed copies of the handbook to property owners adjacent to all the pilot green alleys, as well as to every city alderman. Copies also are available at city hall and on CDOT's Web site. The handbook, in conjunction with public meetings, proved a powerful selling tool to ensure public acceptance of the new designs. Being able to clearly articulate the goals, methods, and outcomes of the testing and research for the program was critical.

Field and Maintenance Testing

CDOT tested the pilot green alleys for several factors over a 3-year period between fall 2006, when they were installed, and summer 2009. The researchers tested for pavement strength; albedo and solar reflective index; permeability, based on lab tests on 6-inch (15.24-centimeter) cores; and infiltration, based on single-ring infiltrometer tests performed in the field. (For the single-ring infiltrometer test, the researchers used a metal ring open at the top and bottom with an area of 1 square foot, or 0.09 square meter, secured to the surface being tested with plumber's putty. They poured a defined amount of water into the ring, usually 3 gallons, or 11.4 liters, and measured the rate of infiltration with a stopwatch.) In addition, researchers performed permeability tests in the field on the subbase material. The tests showed that all the permeable pavements piloted had reduced levels of infiltration in the first year and that void size, ratio of impermeable to permeable, and the presence of trees all influenced performance.

In conjunction with these tests, CDOT staff looked at maintenance equipment and procedures to determine their impact on infiltration. They tested the following pieces of equipment: a regenerative vacuum sweeper (a low-cost but relatively inefficient impeller-driven vacuum system), standard broom-only streetsweeper, sweeper/vacuum combination, power washer, sweeper/vacuum truck, walk-behind vacuum/brush device, and another sweeper with a powerful vacuum. The researchers tested infiltration before and after cleaning in all cases.

The data from these tests indicate that green alleys can experience significant clogging. However, if the pavements are cleaned periodically, before they become too clogged, maintenance staff can restore them to serviceable levels fairly easily. Based on this finding, CDOT developed a maintenance protocol specifying that the alleys should be swept by a streetsweeper, with its water jets turned off, once in the spring and once in the fall at a minimum. Furthermore, CDOT found that porous pavers require replacement of the stone matrix between the pavers after each cleaning or run the risk of becoming deeply clogged and difficult to clean.

Two observations drove these conclusions. First, the lower that CDOT allowed the infiltration rates to fall prior to cleaning, the more difficult it became to restore permeability. Second, debris was particularly prevalent in the spring, due to snowmelt, and in fall, due to leaf matter. The researchers determined that the broom-only streetsweeper, which was relatively successful at restoring infiltration and is standard equipment available in every city ward, should be sufficient if maintenance is performed regularly. Although traditional alleys are not swept regularly, all city streets are usually swept once a month; therefore, CDOT determined that adding the green alleys to the existing routes was a cost-effective solution. On the other hand, although the city has the means to replace the stone matrix in the porous pavers, this activity is more challenging logistically.

More Pilot Projects

Building on the lessons learned from the first round of pilots, in summer 2009, CDOT installed a new full-width pervious PCC alley in the Logan Square neighborhood. The researchers designed this pilot specifically to address two issues they observed in the earlier pilots. First, a more open pore structure appeared to allow for easier maintenance, particularly using the broom-only streetsweeper. Second, achieving an inverse crown on a full-width pervious PCC alley is labor intensive because it must be done in halves and handtrucked into place.

"To address these problems, the department developed a new mix design that contains fibers and utilizes a blend of two different gradations of course aggregates," Williams says.

The crew placed the pervious PCC pavement using a full-sized paver with the vibrating screed engaged and then rolled it with a 48-inch (122-centimeter) roller in the static mode. This design achieved average strengths of 2,607 pounds per square inch (17,970 kilopascals) and average infiltration rates of 799 inches (20.3 meters) per hour, and it has a more consistent void structure throughout the depth of pavement. Further, going forward the design can save labor costs by enabling the crew to pour the full width of the pervious PCC pavement while incorporating an inverse crown.

Applying Lessons Learned

Even before CDOT had gathered all the long-range monitoring data, the initial successes of the green alley pilot project changed the way the department and the Streetscape and Sustainable Design Program in particular do business. The successful design and installation of permeable pavements tipped the balance from asking "Why?" to "Why not?" Although the green alleys methods require further research and development, they added a whole new set of tools to the department's arsenal. To continue learning how and where to use these materials, the department began installing porous pavers in parkways and parking lots, pervious HMA in parking lanes, and pervious PCC in plazas.

With regard to cost, CDOT found that as a market began to develop for permeable pavements, costs began to come down, allowing for more cost-effective design solutions. For example, with permeable concrete, the price for the original product mixed onsite dropped by more than two-thirds in less than 6 months. When sewer infrastructure is not present, green alleys become cost competitive, because they often do not require any new pipes or catch basins. Costs that need to be analyzed closely include increased excavation fees, higher aggregate costs, and increased labor costs, some of which stem from contractors' unfamiliarity with using permeable pavements. On the plus side, recycled content tends to reduce material costs, which could further reduce costs over time.

In fact, the pilots inspired even greater use of recycled materials. "CDOT continued to experiment and develop pavements with higher amounts of reclaimed asphalt pavement, or RAP, and recycled aggregates, as well as to include ground tire rubber in both residential and arterial street resurfacing projects," Williams says.

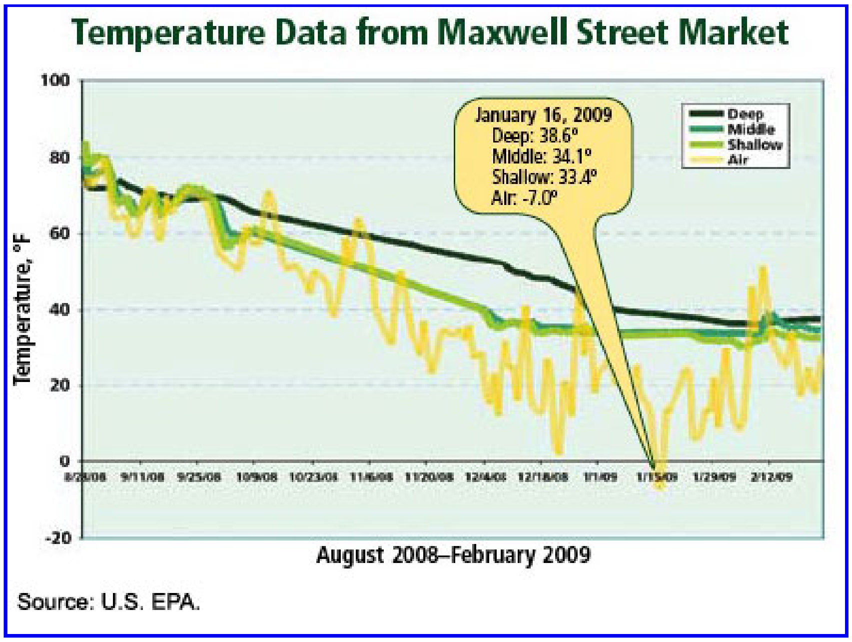
The department also began to investigate the solar reflectance index values of pavements and high-efficiency white light sources and dark sky-friendly lighting fixtures, another feature of the green alley pilots.

One subsequent project that benefited from the lessons learned is the Maxwell Street Market. The project consisted of a streetscape and adjacent parking lot used once a week for a flea market. The parking lot was a brownfield site with tier one exceedances of polynuclear aromatic hydrocarbons and the presence of lead and arsenic in surface soils. The site also had no existing sewer infrastructure but had good soils for infiltration. Due to the contamination, 26,000 square feet (2,415 square meters) of the approximately 1-acre (0.4-hectare) site had to be remediated to a depth of 2 to 3 feet (0.6 to 0.9 meter). Taking these conditions into account, CDOT decided to replace the remediated soil with open-graded aggregate, pave the surface with porous pavers, and install an adjacent bioswale (a concave landscaping feature that reduces the volume and rate of surface runoff and improves water quality). In addition, CDOT had identified the area as an urban heat island hot spot, so the department installed pavers with a solar reflectance index greater than 0.29 (where 0 is a black surface and 1 is a white surface).

Due to the contamination at the site, the U.S. Environmental Protection Agency was interested in using the project as a pilot to examine the effects of stormwater infiltration on groundwater quality in urban conditions and to assess the effectiveness of porous pavers. To help shed light on these issues, researchers installed piezometers with water level loggers, monitoring wells, temperature probes, and a data-logging rain gauge onsite.

Although EPA is still processing the data, Leopold says one of the most exciting things to come out of the project is confirmation of something observed but not actually monitored on the green alley pilot projects: the effect of freeze-thaw on permeable pavements. Temperature probes placed at various depths in the subbase recorded in situ temperatures, while an aboveground thermometer measured the ambient air temperature.

The results show that even when air temperatures dropped below zero, the temperatures in the subbase usually remained above freezing. "This is not only good for the longevity of the pavement," Leopold says, "it also shows that permeable pavements can still be effective during winter months and reduce the amount of snow and ice present compared to traditional pavements." With ground temperatures a few feet below the surface maintaining a constant 55 degrees Fahrenheit (12.8 degrees Celsius), convection created within the interconnected air voids keeps temperatures within the cross section above freezing. This situation allows for water infiltration even in the winter and helps prevent structural damage due to freeze-thaw cycles.



This graph compares air temperature data recorded at the Maxwell Street Market with temperatures measured at various depths below the pavement. The callout highlights the readings from January 16, 2009, showing that even though the air temperature was well below freezing, the temperatures below the pavement were above freezing. Infiltration, therefore, can continue even through the winter, helping prevent structural damage due to freeze-thaw cycles.

Sustainable Streets Program

Another initiative that has grown out of the green alley pilots is CDOT's Sustainable Streets Program. This too began as an innovative pilot project that became a program even before the pilot was completed. CDOT officials describe the scale of the sustainable streets pilot as much more comprehensive than earlier efforts. The project is located on the near-southwest side of Chicago and totals 2.13 miles (3.43 kilometers) along two arterial streets. One street is a five-lane truck route with no onstreet parking and 10- to 15-foot (3- to 4.6-meter)-wide sidewalks. The other is a five-lane truck route with street parking and 20-foot (6.1-meter)-wide sidewalks. Both streets act as dividers between a dense residential neighborhood and an industrial district along the south branch of the Chicago River. Adjacent land uses include a public park, a high school, a coal-fired power plant, small shops, and produce distributors.

The pilot established several sustainable performance categories and goals commonly associated with the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED)-certified buildings, but not typical in streetscape design and construction. Where possible, CDOT prioritized integrated design solutions that maximize environmental synergies.

Recycled content. The project aims to recycle at least 90 percent of the construction waste (excluding landscape debris) based on total weight or volume, similar to USGBC's LEED for New Construction criteria. The sum of postconsumer recycled content plus one-half of the preconsumer content must constitute at least 10 percent (based on cost) of the total value of the materials in the project.

Energy conservation. The project will reduce energy use by a minimum of 40 percent below the baseline for new construction of a typical streetscape, use reflective surfaces on sidewalks and roadways, and use dark sky-friendly lighting fixtures. CDOT also will use materials or products that have been extracted, harvested, recovered, or manufactured within 500 miles (805 kilometers) of the project site, for a minimum of 40 percent (based on cost) of the total materials' value, similar to LEED for New Construction criteria.

Stormwater management. The project will divert 80 percent of the typical average annual rainfall and at least two-thirds of the rainwater that falls within the catchment area using stormwater best management practices. These techniques and strategies will promote infiltration, provide water for new landscaping, improve water quality, and reduce the volume of stormwater that enters the combined sewer system.

Urban heat island mitigation. The project aims to reduce ambient summer temperatures on streets and sidewalks through the use of permeable and high-albedo pavements and coatings on roadways and sidewalks, use of trees for shading, and increased landscaping.

Alternative transportation. CDOT will improve bus stops with signage, shelters, and lighting where possible and facilitate use of bicycles with the addition of new bike lanes. The department also will take steps to enhance pedestrian mobility with new fully accessible sidewalks and improved crosswalks.

Beauty and community. The project will create appealing public spaces that are beautiful and promote community interaction and observation of the natural world.

Water efficiency. CDOT will eliminate use of potable water sources for irrigation, instead specifying native or climate-adapted, drought-tolerant plants for all landscaping.

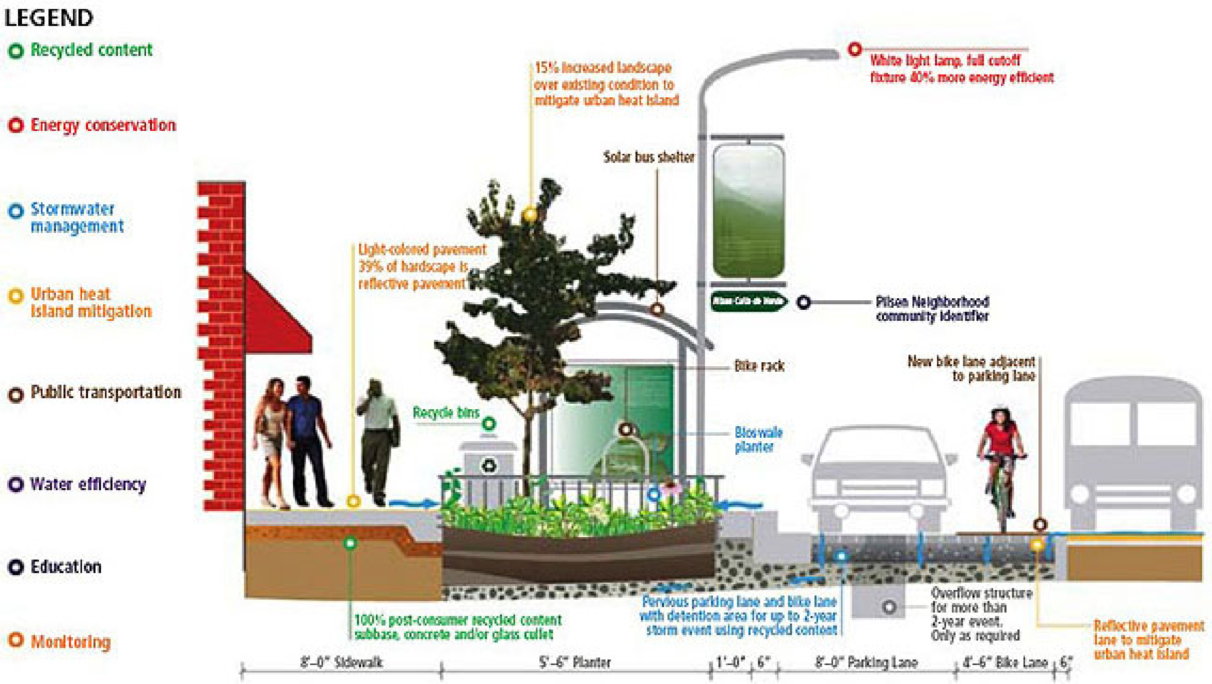
Education. The project will feature public outreach materials and a self-guided tour brochure to highlight innovative, sustainable design features of the streetscape.

Commissioning. CDOT, in partnership with the Metropolitan Water Reclamation District of Greater Chicago, will model and monitor various aspects of the project, including stormwater initiatives and air quality. Researchers will gather data before and after construction to determine the efficacy and long-term performance of these initiatives.

A few of the innovative designs developed for this project to achieve the above goals include a stormwater-fed water feature, a nearly 0.75-mile (1.2-kilometer)-long bioswale interconnected between cross streets, and bike and parking lanes with permeable pavers. Another feature is a stormwater plaza on an adjacent parcel filled with interconnected rain gardens that form a new gateway into the community and provide seating as well as education and public art opportunities.

CDOT is using a number of innovative materials on the project as well, including high-albedo permeable pavers with a photocatalytic cement face mix; a high-albedo, microthin concrete overlay; and PCC with 30 percent recycled aggregate, ground granulated blast furnace slag, and recycled wash water. The project also features warm-mix asphalt with recycled asphalt pavement, light-emitting diode lighting fixtures, and community identifiers with solar- and wind-powered lights and educational signage.

An example of the synergistic design incorporated into this project is the use of high-albedo permeable pavers with a photocatalytic cement face mix in the new bike lanes and adjacent parking lanes. The photocatalytic cement, which uses sunlight and a titanium dioxide catalyst to break down pollutants both on its surface and in the adjacent air, helps improve air and water quality. The pavers' high-albedo surface helps mitigate the urban heat island effect, and their permeability addresses stormwater management. Plus, the pavers' high reflectivity and ability to maintain that reflectivity over time improves lighting uniformity, allowing installation of lower wattage lighting fixtures to achieve higher lighting standards and promote energy conservation.



Source: CDOT

This graphic helps illustrate how the sustainable streets pilot project integrates sustainable principles throughout the design. This proposed cross section through Blue Island Avenue shows bike and parking lanes surfaced with porous pavers and highlights which elements address the project's sustainability goals.

Pedestrian and bicyclist accessiblility also is a factor. Because of the heavy truck traffic, vehicles often park on the existing sidewalk to avoid sideswipes. By narrowing the 20-foot (6.1-meter)-wide sidewalks to 15 feet (4.6 meters) midblock, CDOT found it could add bike lanes and parking, with the sidewalks widening back to 20 feet (6.1 meters) at the intersections. This improves pedestrian accessibility and provides for alternative modes of transportation.

As part of the design and commissioning of the project, CDOT developed a hydraulic model of the stormwater best management practices. The model facilitates evaluating design decisions and provides detailed modeling of green infrastructure that CDOT can apply to a larger model of the city's entire sewershed. These low-impact development strategies can be scaled up, so department staff can assess their impact across sewersheds, allowing for meaningful comparisons of gray versus green solutions. The comprehensive modeling before and after the project's construction will gather important data about the innovative designs and materials specified and enable researchers to calibrate the model with real data to provide more accurate analyses and comparisons. The data also will help the department develop additional maintenance protocols and test their effectiveness.

Inspiring Innovation

As in many transformations, pilot projects provide an opportunity to incubate new approaches and lead by example. Through its Green Alleys program, CDOT staff got its feet wet by applying green infrastructure approaches on small, discrete sites. Today, the department is applying the lessons learned to larger and more complex projects.

The successful techniques developed during the green alley pilot projects are quickly becoming integrated throughout the department. Through the Streetscape and Sustainable Design Program, CDOT is promoting the use of pervious pavements in the city's riverwalks, bicycling facilities, and streetscapes. And larger scale highway and bridge projects too are incorporating permeable pavements and stormwater best management practices, such as in the reconstruction of U.S. 41 and the relocation of Torrence Avenue. The experience using innovative materials in pavement designs also led the department to explore use of recycled roof shingles in HMA on another recent project.

In addition to driving its own internal improvements, CDOT is sharing its green alleys strategies with other cities around the country and internationally. Through the deployment of green urban infrastructure and use of the public right-of-way to create sustainable public spaces, CDOT is not only reshaping business as usual, but perhaps turning the DOT's old enemy -- stormwater -- into a community ally.

CDOT

These workers are installing pervious concrete in a reconstructed alley in the Hegewisch neighborhood. The concrete incorporates recycled slag, which helps increase albedo and reduces the urban heat island effect. Due to the alley's tight constraints and the need to create an inverted profile, the workers poured the pavement for one half of the alley at a time.

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