

# PRACTICE MAKES PERVIOUS

**LOS ANGELES STARTS SMALL WITH NEW STORMWATER STRATEGIES, BUT THEIR POTENTIAL IMPACT IS HUGE.**

BY LISA OWENS VIANI

Los Angeles is said to have 8,345 miles of streets, and as I navigate its freeways, gazing at the concrete and asphalt sprawling before me, I have no reason to doubt that number. A map assembled by the city's Department of Public Works shows that about two-thirds of the city's ground is impervious to rainwater. Even parts of the Los Angeles River are famously encased in concrete.

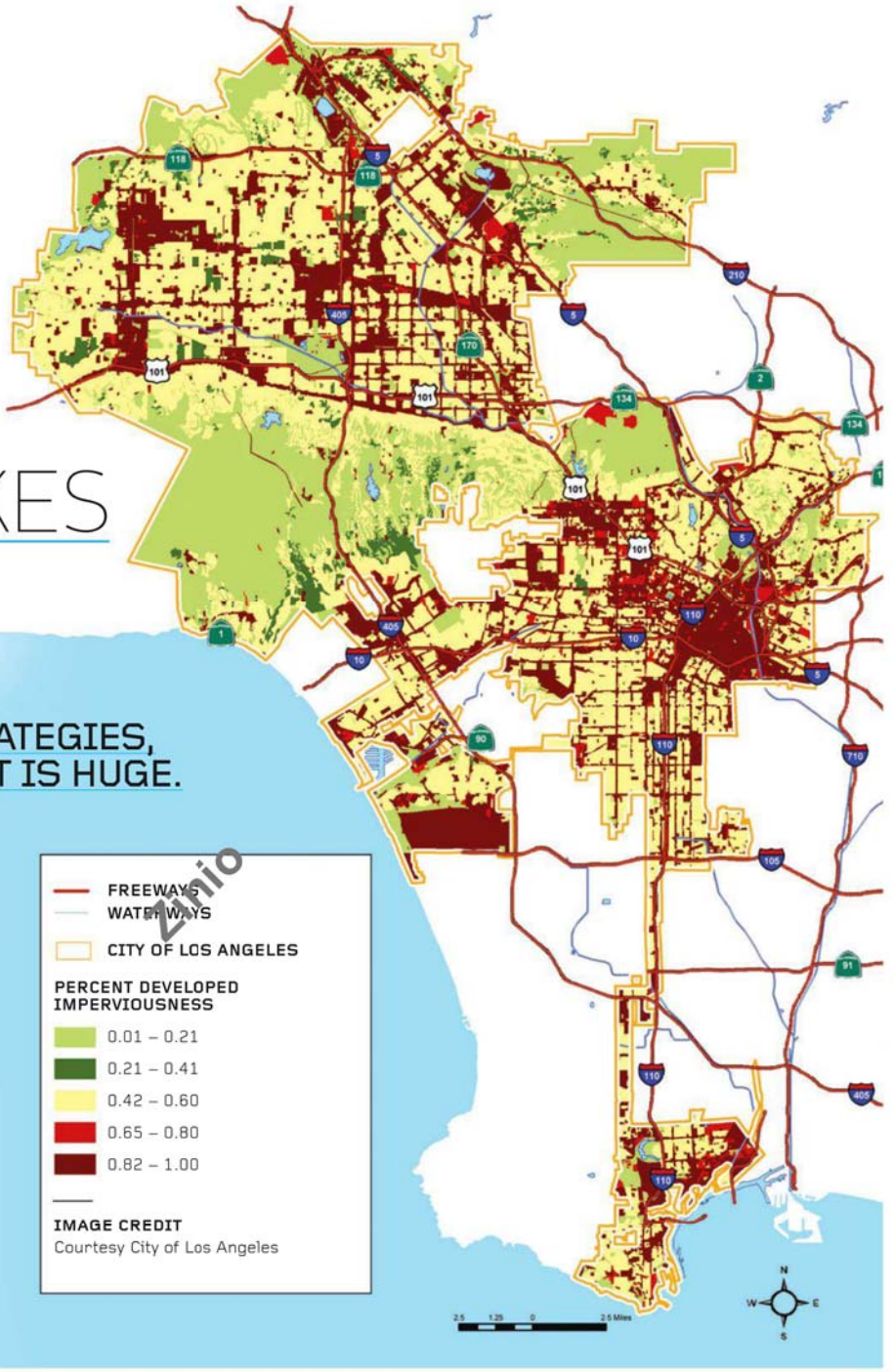
But the city is starting to peel back its hard cover. In the past couple of years, it has put together a green streets committee populated by employees from various municipal offices and has developed standard design plans for green streets features. Standard plans and details are now on the books for right-of-way or "parkway" swales (with and without parking), infiltration swales, vegetated curb extensions, and permeable pedestrian and vehicular alleys. They all can be adopted without the expensive special approvals required in the past.

"The development of standard plans for green streets is huge," says Paula Daniels, a commissioner with the Board

of Public Works. The standard plans could soon be backed up by a new low-impact development (LID) ordinance. The ordinance was approved by the Department of Public Works in January 2010, and the city council is expected to vote on it this summer. If it is adopted, the ordinance will expand on stormwater mandates from the state, explains Michael Scaduto, an environmental engineer with the public works depart-

ment. It would require property owners to manage the first three-quarters of an inch of a rainfall event through infiltration, capture and use, and biofiltration measures. Such measures can—but are not required to—use the new standard designs. However, the designs are intended to make permitting less expensive and to streamline the process of approval. They will be included in a new LID handbook that is being developed.

Daniels is not a landscape architect, but she is enthusiastic about the role that the profession will play in the design of future stormwater infrastructure. Her passion for greener stormwater treatment and better water quality was inspired by the late Dorothy Green, an influential California water policy reform activist. Daniels came to her position with the city after working as an attorney in private practice and sitting





**ABOVE**  
This conceptual sketch shows in three dimensions the inlet, filter, and flow dispersal (infiltration gallery) system at Riverdale Avenue.

**IMAGE CREDIT**  
Courtesy City of Los Angeles

on the board of directors of the nonprofit group Heal the Bay. Her work there on stormwater issues prompted Anthony Villaraigosa, who was then a state assemblyman, to appoint her to the California Coastal Commission, a state agency that oversees development along the coast and also deals with stormwater issues related to development. Villaraigosa became the mayor of Los Angeles in 2005, and, having been impressed by Daniels's work at the Coastal Commission, he appointed her as a full-time commissioner with Public Works in 2006.

"We're finally transitioning from the century of the engineer to the century of the landscape architect and interdis-

ciplinary collaboration," Daniels says. "Our city came of age in the age of engineering and automobiles. We were ignorant about our impact on natural resources.... [But] there's been a real turnaround. We're moving stormwater management from mechanical treatment toward infiltration, and the role of the landscape architect has become more and more prominent."

What is prompting this shift? One of the big drivers is regulatory. The federal Clean Water Act requires states to develop lists of "impaired waters," where certain types of pollution exceed specified limits. For each of the problematic pollutants identified, the states must establish a TMDL or total maximum daily load of that pollutant that can enter the water.

The Los Angeles Regional Water Quality Control Board recently issued a TMDL for heavy metals in the Los Angeles River. The biggest source of these metals is stormwater from roads, which carries the by-products of brake-pad linings from motorists' constant stop-and-go driving. To build end-of-pipe-type treatment plants to address these ubiquitous pollutants is prohibitively expensive, according to studies that have been performed by the city of Seattle and the San Francisco Regional Water Quality Control Board, among others. Traditional engineering systems also do not have the multiple benefits of natural drainage systems, which beautify neighborhoods, filter air pollution, and can even help create resilience to climate change—the literature examining these concomitant benefits is deep; most recently they

were enumerated in a report released in February by the Center for Clean Air Policy in Washington, D.C.

Another TMDL has been drafted for bacteria in the Los Angeles River. Animal waste from streets and sidewalks and illegal dumping and connections into storm drains all contribute bacteria, says Deborah Deets, ASLA, a landscape architect with the city's Watershed Protection Division.

Another driving force behind the movement for green streets has been local nonprofits that are concerned about water quality in the Los Angeles River and other waterways. Two of the three projects that have gone in the ground to date were initiated by the Los Angeles and San Gabriel Rivers Watershed Council, North East Trees, and TreePeople. North East Trees designed one project on Oros Street; the Watershed Council came up with the initial design for a second, Elmer Avenue, which was refined by the city; and all of the nonprofits supported the city in implementing a third pilot project, on Riverdale Avenue, through its green streets committee. The nonprofits and the city worked together to build Oros and Elmer, with the nonprofits approving the final construction plans and overseeing construction. At Elmer, Guy Stivers with both Stivers and Associates and Dudek, drew up the initial planting plans and palettes for the bioswales on behalf of the watershed council; his work was later refined by landscape architects with the city. Stivers also worked with residents to integrate their front-yard plantings into the project.



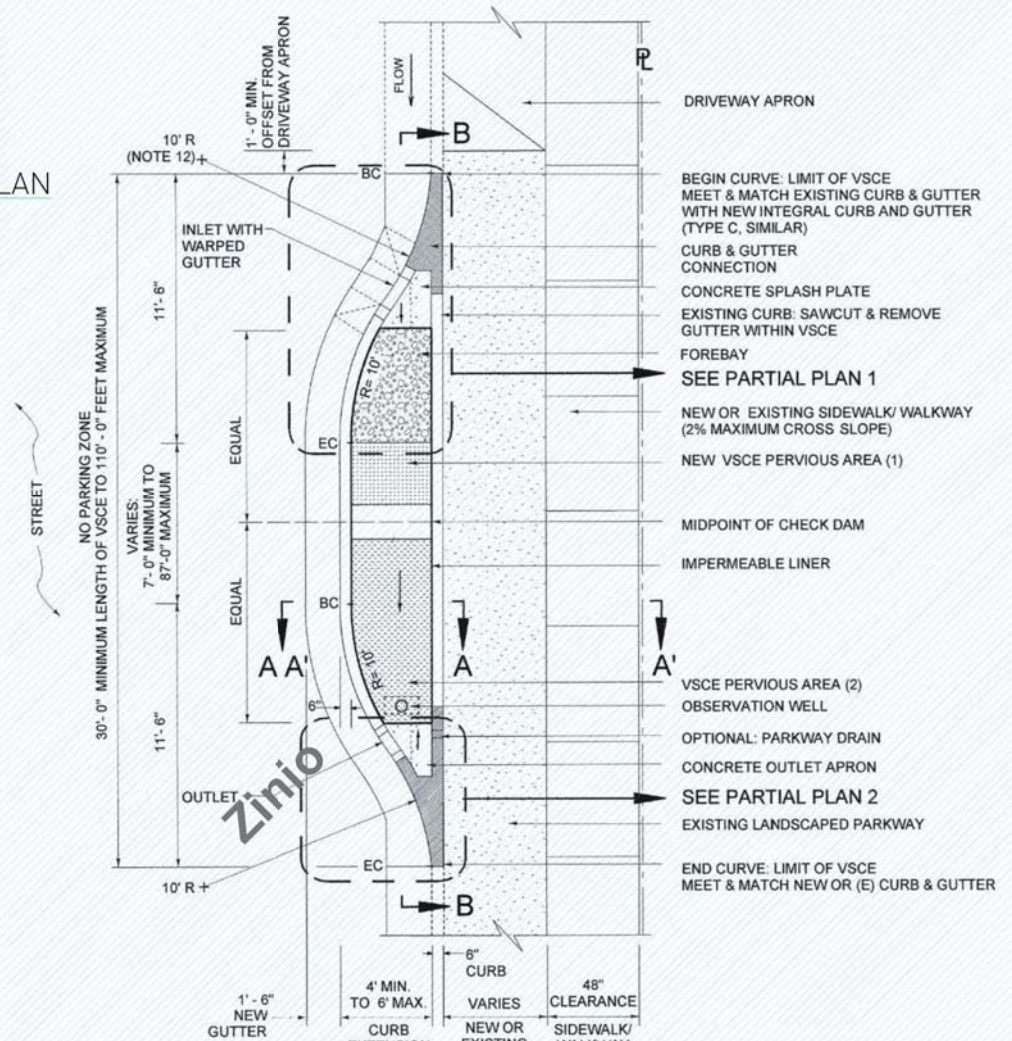
## THESE PAGES

These standard plans were developed from the pilot project at Riverdale Avenue.

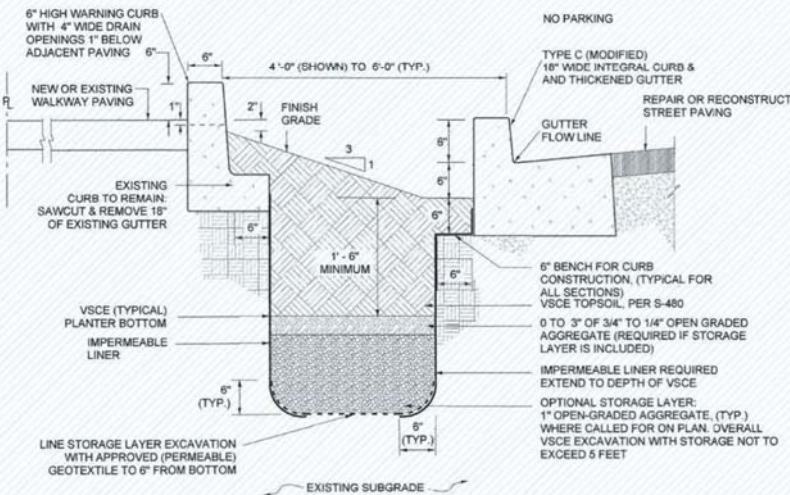
## IMAGE CREDIT

Courtesy City of Los Angeles

## PLAN



## SECTION A - A



STANDARD GREEN STREETS PLANS ALLAY CONCERNS ABOUT THEIR COSTS, NOT LEAST BECAUSE THE PLANS ARE PREAPPROVED BY THE CITY.



**TOP TO BOTTOM**

The Elmer Avenue green street replaced lawns with climate-appropriate plants and asphalt with stormwater infiltration swales. A curb extension at Riverdale Avenue thrives with native grasses. Downtown, a private developer installed stormwater planters in the public right-of-way, the first such project in a commercial area. One resident replanted his swale with ice plant.

**IMAGE CREDITS**

Lisa Owens Viani



← they are preapproved. And when our engineers design projects, they can reference them. They don't have to do all new designs. And I hope they will all use them."

Daniels's initial strategy was just to "get folks to have a discussion" about the possibility of trying some green street pilots. "I just wanted to start the conversation, ask 'What if we tried to do it here?' [and] let it bubble up," she says. She decided to create a green streets committee by inviting all of the bureaus and divisions that have work related to managing streets, including several bureaus within the Department of Public Works (Street Services, Sanitation, Street Lighting, Contracts Administration, and Engineering), plus other city departments, including Recreation and Parks, Planning, Transportation, and Building and Safety.

The committee then worked with city engineers to push a pilot project, says Daniels, recalling that the engineers at first were very hesitant to experiment. "They were concerned about how it would work, and had a lot of understandable questions," she says. Daniels brought in engineers and academics from Portland, Oregon, and Santa Monica, California, to give presentations to all of the city bureaus. She knew that having the city build one pilot project itself would be huge, and she had the authority through her position (the commissioners act as the general managers

of the Department of Public Works) and the support of the committee to move the process forward. Still, Daniels admits, it took a little while for the idea to gain traction. If she met with resistance in one area, she worked her way up the chain to get more support. One source of support came from the Community Redevelopment Agency, which was also interested in doing a green streets project (and was an agency Daniels had pushed to do so while she was with Heal the Bay).

The Los Angeles River forms the backdrop for two of the green streets pilots. The first, Oros Street, was completed in 2007 with \$935,000 in state and federal grants. North East Trees designed the project, and the city worked with the group to refine the design and build it. Oros Street uses bioswales built in the city's 10-foot-wide "parkway easement," the public right-of-way between the street curb and private lot lines, to treat runoff from 17 residential lots that total 2.3 acres. The swales catch runoff coming into them via sheet flow or trench drains installed in the driveways. Downstream, next to the river, the city built a large underground infiltration gallery beneath Steelhead Park, a small, lovely pocket park. The infiltration gallery, filled with gravel and perforated pipe, slows and treats extra runoff that doesn't infiltrate into the streetside swales.

Several blocks away lies the most recent project, Riverdale Avenue, completed in August 2010 with a \$500,000 grant from the California Coastal Conservancy. "The whole point of Riverdale was...that people in our department would really understand it and be able to replicate it," says Daniels. "It was meant as a learning process for the city, and it became the basis for developing the standard

While the nonprofits were approaching the city with green streets ideas and plans, Deets and Daniels were at work behind the scenes, trying to change old ways of thinking about stormwater. The biggest fears about green streets had to do with costs, particularly the costs of design and maintenance, Daniels recalls. But she says those have been allayed with the development of the standard plans. "With the standard plans for the public right-of-way, anyone can use them—

plans.” The Riverdale project, like the project on Oros Street, also treats a residential area, approximately three blocks totaling 14.6 acres. Here, too, curbside swales capture and infiltrate runoff, replacing lawn and concrete with drought-tolerant native plants. Some swales were paved with perme-

improvements to private property, and community outreach), the street captures and treats runoff from 40 acres via the swales and a large infiltration gallery beneath the street. Robert Gutierrez, ASLA, a landscape architect with the Bureau of Street Services who worked on improving the designs for

ties for stormwater recharge in L.A., and we are furiously pushing them.”

All three of the projects were fitted with inexpensive filters to treat bacteria, explains Deets. Initial monitoring results at Riverdale show that 100 percent of the bacteria is being filtered out. Belden points out that microorganisms in the soil will likely do the same thing. “We’re relying on natural soil processes to reduce pollutant loads,” Belden says. “The bacteria in the soil can consume the hydrocarbons and clean the water.” Monitoring results for heavy metal uptake are still pending, but similar projects in Northern California have reduced heavy metals by as much as 80 percent, according to new research by the San Francisco Estuary Institute.

At least two acre-feet of water have been captured by Elmer so far, says Belden, and the project also removed existing turf, which reduced the amounts of potable water being used for landscape plants. Although the native and drought-tolerant plants in the swales will be irrigated for the first few years while they become established, they are expected to survive eventually with little to no irrigation (aside from an area where one resident insisted that the city replant his swale with turf).

The partnership between the watershed council and the city at Elmer Avenue offers a viable way to implement innovative stormwater treatment projects, says Belden, with the nonprofit having done the studies and initiating the idea, and the city coming in to help build it. “It’s what encouraged the city and also gave them the freedom to try something they might not traditionally do.” ●

LISA OWENS VIANI IS A WRITER IN THE BAY AREA AND A FREQUENT CONTRIBUTOR TO *LANDSCAPE ARCHITECTURE MAGAZINE*.

## THE ELMER AVENUE PROJECT BEGAN WITH AN IDEA AND STUDIES FROM A NONPROFIT, THEN THE CITY HELPED BUILD IT.

able pavers at the request of residents, which Daniels found disappointing, and the result is less green than one might hope. One resident took the opportunity to plant edible greens and herbs. A high point of the site is a curb extension/stormwater garden planted with native grasses designed by Deets, who drew up some of the standard plans along with landscape architects and engineers in other city bureaus.

Elmer Avenue, completed in May 2010, is the most ambitious of the three pilot projects. “For Los Angeles right now, Elmer is the best site to see multiple approaches to stormwater management,” says Edward Belden, the water programs manager with the Los Angeles and San Gabriel Rivers Watershed Council, which approached the city with the idea for the project. The project took a residential street without sidewalks, curbs, or gutters, situated in a low-lying, flood-prone “bowl” between the Los Angeles River and the Tujunga Wash in Sun Valley, and transformed it by adding bioswales planted mostly with drought-tolerant native plants, new sidewalks, native plantings in front yards, and even solar-powered street lights. The most costly of the three projects, at just under \$2.7 million (including the streetlights,

the project, says the site is performing extremely well in storms, capturing a significant amount of water during the “first flush” rain event. The project is designed to capture the two-year storm for a 40-acre watershed, says Gutierrez, which loosely translates to approximately 16 acre-feet. Another important benefit, he adds, is that the project also treats dry-weather flows from excess irrigation, car washing, and so forth. “This helps reduce greatly the amount of pollutants that enter the Los Angeles River,” Gutierrez says.

At Elmer, the filtered stormwater recharges a groundwater aquifer that provides drinking water to city residents. This created some concern initially. Is it a good idea to direct water from the street into the aquifer? The nonprofit Los Angeles and San Gabriel Rivers Watershed Council spearheaded a detailed water augmentation study with several partners, including the city, that monitored six stormwater infiltration/groundwater recharge sites and found no negative impacts to groundwater from infiltrating stormwater. Unlike in Northern California, much of Southern California’s water comes from rainwater percolating into the aquifers. Belden, who managed the Elmer Avenue project, says, “There are lots of opportuni-