

Exploring New Partners to Green Our Urban Landscapes

Making the business case for green infrastructure investments



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By Larry Levine and Paul Davis

In the summer of 2012, the managers of the 1330 Boylston apartment complex in Boston, MA, installed a green roof—a stormwater-abating, energy-saving vegetative roofing system—that cost the company about \$112,500.

Though there's a commonly held belief in the commercial real estate world that green stormwater management infrastructure doesn't pencil out, Samuels & Associates, the management company, couldn't have made smarter use of its money. Views of the green roof proved so popular with tenants that those in the 25 or so units overlooking the green roof abided rent increases of between \$300 and \$500 a month. That netted Samuels an additional \$120,000 a year and increased the complex's value by approximately \$2.4 million, according to a J.P. Morgan Asset Management estimate.

Talk about return on investment!

Green infrastructure, which sometimes goes by the title low impact development (LID), is increasingly being recognized—even without the subsidies and incentives offered by some cities—as cost competitive and even profitable for commercial property owners and developers. That's especially the case when return on investment is seen through a broad lens, one that keeps in view factors that include energy savings, compliance costs, and vacancy rates.

That's all good news for municipalities hoping to bring the commercial real estate sector on board as an important partner in the prevention of stormwater pollution—something that private properties can often deliver at lower costs than retrofits on public property.

As stronger stormwater regulations proliferate in major cities, and as EPA contemplates regulations that will drive natural stormwater management approaches over conventional gray infrastructure, what can bring municipalities and commercial real estate together?

Local government incentives and innovative financing tools can play a role, particularly in jumpstarting a market in green designs. But green infrastructure also generates a wide range of monetizable benefits for real estate companies' bottom lines, and these can often dwarf the value of government incentives. This opens the door for greater alignment of interests between the development community, seeking to maximize profits, and municipalities, seeking cleaner rivers, beaches, and streams and economic growth.



Photos: The Icehouse
The Icehouse condo development in Philadelphia, which features green roofs, has sold for more than surrounding real estate.



In the “green versus gray” cost debate for private development, although costs can vary widely based on site-specific conditions, green infrastructure, which retains and treats rainwater onsite using natural processes, increasingly comes out ahead. “There are going to be times where it won’t work or won’t be as cheap. And not every designer who wants to employ green infrastructure does it right,” says William F. Hunt, a professor of biological engineering at North Carolina State University (NCSU) in Raleigh and a leading national expert on green infrastructure. But frequently, he says, green infrastructure has a financial edge.

The best way to understand that is by looking at the big picture. Gary J. McCabe, president of Red Line Engineering, also in Raleigh, explains that when he talks to clients. “Usually, I tell developers that they can do much more with their site if they use low impact development.” McCabe offers as an example a residential development his company worked on in Wilmington, near the North Carolina coast. With conventional stormwater infrastructure, the developer could have installed five single-family homes. But green infrastructure would make room for 10, by reducing the space needed for conventional pipes, drains, and a retention pond. (Those tend to “make

great habitat for mosquitos,” he notes sardonically, and can create liability risks, too.) “When I explain it in those terms, developers say, ‘Well, what can you do with my site?’”

With green infrastructure, developers and property owners can save a lot of money on big-ticket conventional stormwater devices. “There aren’t a lot of curbs, gutters, catch basins, sewers, which are the biggest capital costs in conventional stormwater applications,” explains Professor Thomas P. Ballestero, director of the Stormwater Center at the University of New Hampshire, in Durham. “In a lot of the sites we’ve designed with green infrastructure, we’ve been able to get

away with no plumbing, or much less. That's what we've seen in our studies and EPA and other related studies.”

Some individual green infrastructure practices can be less costly than gray, even when they don't fully replace pipes and gutters. For instance, though permeable pavement—everything from porous asphalt to interlocking concrete pavers—is typically more expensive to install at present, studies show maintenance and life-cycle costs are significantly lower. That's been the experience at many parking lots installed by Studley, the global commercial real estate services firm, says corporate managing director Rich Dale. “With regular asphalt, after a few Chicago winters, you've got to repave,” due to frost heaving, he says. Permeable pavement, by contrast, is durable. “It's the lower-cost alternative.”

Expand that scope outward and even more savings come into view. Consider green roofs. To begin with, they can double the life of a conventional roof, from 20 to 40 years. The Natural Resources Defense Council (NRDC) report, [The Green Edge: How Commercial Property Investment in Green Infrastructure Creates Value](#), issued in December 2013, estimated that installing a 17,900-square-foot green roof—a typical roof size for a medium-sized, three-story office building—would save almost \$272,000 on roof replacement costs over a 40-year period. Add to that energy savings that can range from 5 to 75% (depending on building characteristics and local climate), thanks to the increased insulation a green roof provides. By cooling the roofs where many air-conditioning systems are located, green roofs can also improve HVAC system efficiency, resulting in further savings, including the potential for smaller, less expensive air-conditioning units on a rooftop.

Then, there are what one might call the “green infrastructure intangibles,” which are becoming increasingly quantifiable: People love green roofs and other green space, which often signify “green building” to both owners and tenants. In Philadelphia, where stormwater fees are based on a site's impervious area, “Building owners start considering them by thinking, ‘How can I get rid of this stormwater charge?’” says developer and builder Jim Maransky of The Envision Group. “Then, they're ‘Googling’ them and falling in love with the pictures.” Maransky's green-roofed IceHouse condo development has sold at higher prices than any other residential development in Philly's Fishtown neighborhood, ever.

In many locations, green roofs are becoming an in-demand amenity, rather than simply a feature that reduces runoff and cuts energy bills. That's been the case in Washington DC, where Akridge, one of the city's best-known commercial real estate firms, has more than 35,000 square feet of green roofs on five buildings, with two more to come. “We have clients who perceive this as added market value,” says Michele Good, Akridge's director of sustainability. Many tenants far prefer looking out on a green roof than on a conventional roof, says Jay Black, director of sustainability at SL Green, New York City's largest commercial property owner. “When you do leasing, a green roof is always a highlight to be able to point out.”

Green roofs and other green stormwater features can also help buildings acquire points in the Leadership in Energy & Environmental Design (LEED) building rating system designed by the US Green Building Council (USGBC). Studies show LEED certification—which relies on a host of sustainable building practices—increases building return on investment by 9.9% for new

projects and 19.2% for existing projects, cuts operating costs by between 13.6 and 8.5%, ups building value by between 6.8 and 10.9%, raises occupancy rates by between 2.5 and 6.4%, and, helps command the highest rents.

What LEED once called “stormwater management” and now calls “rainwater management”—“We’re trying to refocus on rain as a resource,” says Theresa Backhus, a USGBC site technical specialist—can net three points alone. (LEED is a 100-point rating system, with LEED certification starting at 40 points, a silver rating at 50 points, a gold rating at 60 points, and, a platinum rating at 80.) For green roofs and other green infrastructure features, there are also points to be had for innovation, heat island mitigation, habitat creation, open space, water efficiency, and regional priorities. In other words, when developers use green infrastructure, LEED points can quickly add up.

Many green infrastructure features rely on trees and other landscaping to absorb rainwater. That, in turn, can add a lot of value to commercial real estate—increasing rental revenues by 7% in commercial office buildings, for example, based on studies collected in NRDC’s *Green Edge* report. Similarly, research on urban business districts and strip malls shows that consumers are willing to spend more money on products, visit more often, and travel farther to shop in areas with attractive landscaping, good tree cover, or green streets, all of which green infrastructure can provide. “Emotions, amenities, and aesthetic appeal are part of the decision of where and what to buy. And plants contribute to that,” explains Kathleen Wolf, a research social scientist at the University of Washington, in Seattle. One of her research studies found increased occupancy rates in commercial real estate associated with good quality landscaping versus real estate where the landscaping was poor or neglected.

Spending on green infrastructure can also be thought of in terms of incremental costs, rather than simply on installation and maintenance costs alone. That’s because 18 states and the District of Columbia have specific “onsite retention” standards, which require development -projects to infiltrate, evapotranspire, or harvest and use a specified volume of runoff onsite, wherever feasible. This approach is primed to spread nationwide, especially if EPA delivers on long-promised reforms to its stormwater rules, which would require developments to be designed to retain the vast majority of their stormwater.

For new development and redevelopment projects subject to these rules, the cost and return on investment of green infrastructure should be examined with existing and upcoming compliance costs in mind. If each dollar spent on compliance brings a range of benefits—not merely the benefit of obtaining permission to build a project—then stormwater infrastructure investments become an asset, not a liability. With rainwater harvesting, for instance, “if you don’t reuse that water, you have put a lot of costs sunk only into detention,” explains **John Bauer, president of Water Harvesting Solutions, in Hinsdale, IL**. In such cases, having the ability to use rainwater for irrigation, mechanical makeup water, or toilet flushing can cost only 5 to 10% more than simple detention. “If you look at the return on investment calculated on just the incremental costs, that can be four to six years,” says Bauer. “And that fits into a lot of budgets.”

In places like the drought-stricken West, having access to rainwater is becoming increasingly appealing. “Water is very much a commodity in California, and interest perks up when there’s a

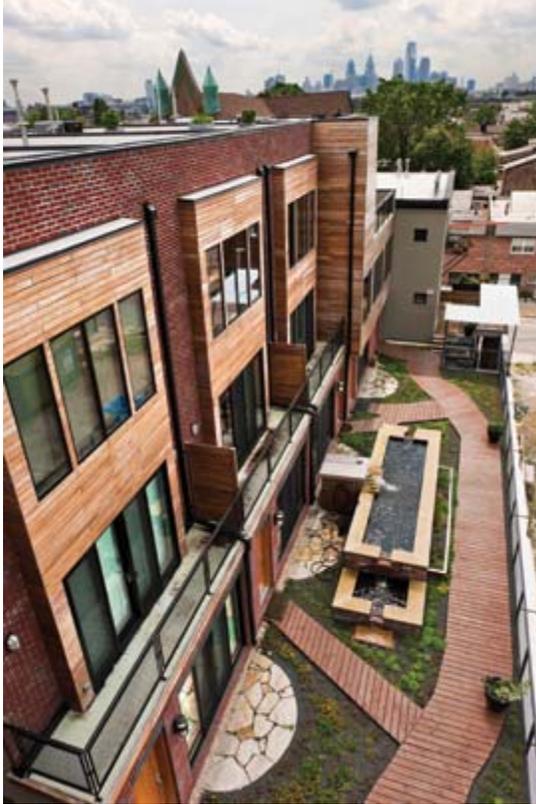
drought,” says Janelle Allen, a project executive at BNBuilders, a commercial builder based in both California and Washington state. “People are willing to make an investment in these things if they think about the future cost of water.”

California cities, like San Francisco, San Diego, Santa Monica, and Los Angeles, have all found enthusiastic response for pilot rain barrel and rainwater harvesting programs—with the city of Los Angeles estimating that the 1,000 barrels that have been distributed so far save residents 600,000 gallons of water for irrigation each year. Additionally, rainwater or stormwater capture strategies can be used to help infiltrate runoff, recharging groundwater critical for western states. Larger developments can also see major benefits by installing large-scale capture and storage systems for onsite use, replacing potable water with captured rainwater for uses like irrigation and toilet flushing. California, for example, revised its plumbing code last year to give developers more flexibility to use captured rainwater onsite.

And let’s not forget the feel-good public relations bump that comes from choosing environmentally friendly measures in commercial real estate. “We’re helping the greater good,” explains Sara Schoen, manager of energy and sustainability at First Potomac Realty Trust, a commercial real estate firm with more than 9 million square feet of space in Washington DC, Maryland, and Virginia. The company has two green roofs, with another two on the way. “There’s good PR to be had from that and marketing opportunities and corporate citizenship. That draws interest and makes people more likely to rent in our buildings.”

In the water-quality contest between green infrastructure and conventional stormwater infrastructure, green infrastructure is the winner, hands down. In its authoritative 2008 report, *Urban Stormwater Management in the United States*, the National Research Council explains why: Conventional stormwater management focuses on flood control to protect life and property but doesn’t adequately address the water-quality problems stormwater causes. (All too often, it doesn’t address flood control effectively, either.) Green infrastructure, on the other hand, “if sited, designed, constructed, and maintained properly, can release pollutant loads an order of magnitude lower than that of conventional stormwater treatment,” says NCSU’s Hunt. “This is due mainly to the pollution removal reduction mechanisms LID practices employ, notably infiltration.”

Hunt offers as an example the stormwater pollution he’s been monitoring from two adjacent sites in Raleigh. One site is a shopping center, called the Market at Colonnade, which uses green infrastructure, including a prominently displayed cistern for harvested rainwater and bioinfiltration features to absorb additional runoff. The other site uses conventional stormwater measures. In comparing the run-off from the two sites, Hunt found that stormwater releases from the Colonnade had less than 5% of the pollution released from the conventional site, including total nitrogen (TN), total phosphorus (TP), total Kjeldahl nitrogen (TKN), total ammoniacal nitrogen (TAN), nitrite-nitrate nitrogen (NOX), organic nitrogen (ON), orthophosphate (Ortho-P) and total suspended solids (TSS).



The Icehouse

The Colonnade’s developer, Regency Centers, has said that its project has been so successful—both environmentally and financially—that the company would pursue similar approaches even in areas without government incentives, like the one it got for the Colonnade from the state’s North Carolina Clean Water Management Trust Fund.

Writing in the January/February 2014 issue of *Urban Land*, Regency Centers’ vice president for sustainability, Mark Peternell, said that the project’s success has “started transforming how we think about the return on investment in green infrastructure.” At this urban infill site, he said, “by avoiding the need for an above-ground pond, we had the buildable space we needed to construct a profitable retail center.”

Involving the private sector in stormwater management efforts such as these can lead not only to cleaner water for everyone but also to lower stormwater abatement costs for municipalities—an objective that every city, town, and utility seeks to pursue. To help reach that goal, a host of cities are already using subsidies, tax abatements, and other

financial carrots. Creating innovative new programs—for example, facilitating aggregation of projects across multiple property owners, to create economies of scale—is also helping move interest forward.

In fact, the use of subsidies, tax credits, and other incentive programs is becoming increasingly common. New York City and Philadelphia, for example, offer tax credits for green roofs—up to \$200,000 in New York and \$100,000 in Philadelphia. Montgomery County, MD’s Rainscapes Rewards program offers rebates for residential, commercial, industrial, and institutional green infrastructure projects that cap out at \$10,000.

Seattle provides a number of incentives, including one that pays builders 50% of the cost of green infrastructure retrofits, up to \$20,000. A more novel approach is reflected in the Emerald City’s Deep Green Pilot Program. In exchange for capturing and using 50% of stormwater onsite (and reducing energy and water consumption by 75%, and meeting additional criteria that make up a green building rating system called the Living Building Challenge), the city allows departures from its zoning code that provide for additional floor area or building height.

Under the Deep Green Pilot Program, the international developer Skanska and its tenant Brooks Sports, the running shoe and athletic apparel company, are pursuing ambitious green infrastructure measures at a site called Stone34 that Skanska is developing at the intersection of Seattle’s Fremont and Wallingford neighborhoods. These measures include a green roof, permeable pavement, and rainwater harvesting, in exchange for 20 additional feet of building

height and sizeable increases in the amount of retail space the building can house. (The harvested rainwater will be used for toilets, mechanical makeup water, and irrigation.) Dan Matheson, Skanska USA's director of development, says the Deep Green Pilot Program "helped us make this particular building work for the tenant we had." He explains, "Designing the building we wanted to provide at this location required some zoning changes, and the Deep Green Pilot Program helped make those possible."

In Washington DC, where 43% of the city's land area is impervious and the city has some of the most protective stormwater rules in the nation, new programs are incentivizing green infrastructure retrofits on existing developed sites. Among them is a stormwater retention credit trading program, now under development, that will allow property owners to build additional green infrastructure capacity (beyond minimum regulatory requirements) and trade credits with other property owners who aren't able to cost-effectively mitigate all of their stormwater onsite. That idea appeals to Akridge, which has applied to get some of its green roof capacity certified for trading. "We need to pilot this and see how it works," says Michele Good, the company's director of sustainability. "If we can get value out of our building technologies, that's a huge opportunity for us."

While offsite mitigation and trading programs like Washington DC's have the potential to encourage green infrastructure retrofits, municipalities must be careful to ensure the water-quality benefits of these programs by building in key environmental safeguards. For example, credits should never be traded between different watersheds (drainage areas), and the "lifespan" of a tradeable credit should always be concurrent with the lifespan of the green infrastructure practices that generated the credit.

To explore how governments can further involve commercial real estate owners, developers, and investors in the public good of building and maintaining green infrastructure, NRDC has teamed up with EKO Asset Management Partners and The Nature Conservancy in a collaboration called the Natural Infrastructure Finance Laboratory, or NatLab. Using Philadelphia's nation-leading green infrastructure efforts as a starting point, NatLab's 2013 report, *Creating Clean Water Cash Flows*, found a number of promising strategies that cities can deploy to help get private-sector owners and developers involved in green infrastructure retrofits of existing developed sites.

Among them:

- *Onsite capture standards for new development and redevelopment.* As noted above, regulatory requirements are a key driver of green infrastructure on private property in many locales. Applying these standards to redevelopment projects leads to the transformation of existing built-out areas.
- *Offering subsidies for green infrastructure on private property.* If directed toward projects where a private party pays a share of the upfront costs and/or assumes responsibility for long-term maintenance, public subsidies can leverage additional private investment.
- *Parcel-based stormwater fees and credits.* Stormwater utility fees tied to the amount of impervious area on a site should be paired with the opportunity to reduce those fees through installation of green infrastructure.

- *Facilitating project aggregation.* Bundling together a portfolio of green infrastructure projects can help drive down costs. Non-governmental organizations, for-profit project developers, or public-private partnerships can serve as project aggregators. Municipalities can also serve in that role, or can facilitate aggregation through steps like enabling business improvement districts to collectively manage runoff from a cluster of parcels.
- *Offsite mitigation and stormwater credit trading.* These strategies require careful planning and monitoring to ensure that stormwater capture happens in the right place, and at the right time, to meet water-quality goals in receiving waters. When done well, they can help direct dollars to the most cost-effective retrofit projects.
- *Public-private partnerships.* These contracting arrangements, which have so far been more common in large-scale, centralized infrastructure projects, can be adapted to accelerate large-scale private investment in cost-effective green infrastructure retrofits.

Private-sector supporters of green infrastructure have additional suggestions about how municipalities, states, and other government entities can promote green infrastructure in commercial real estate. Education and outreach are prime among them.



“Education about the technologies, costs, risks, and risk aversion would be very helpful,” says Sara Schoen of First Potomac Realty Trust. Schoen is interested in learning more about permeable pavement. But “the time we have to devote to research and exploration is limited. If the city could do that research for us, and show us case studies where this is cost-effective and there’s not a large risk to the owner that would make a significant difference.”

Credit: Regency Centers

This cistern at the Regency Centers Market at Colonnade project in Raleigh, NC, collects runoff from the roof of Whole Foods Market, which is then used for interior flush fixture plumbing.

“I think education is one of the biggest things governments can do,” says McCabe of Red Line Engineering in Raleigh. “They absolutely need to educate the construction industry and developers. Also, cost information would help.” How much do green infrastructure measures cost and how do they

compare to more conventional approaches? Developers tend to believe that green infrastructure costs more, even though, when done right, it can save money, especially as costs come down as these technologies become more and more commonplace. McCabe has observed the upfront cost of permeable pavement, for instance, was once 100 to 150% more than conventional asphalt, but now is only 30 to 40% higher.

EPA, university researchers, trade associations, and other nonprofit organizations have been publishing these sorts of case studies for years—with consistently positive findings on the cost-effectiveness of green infrastructure—so the state and local officials who deal most directly with the development community should be promoting these more heavily. Moreover, reports like NRDC’s *Green Edge*—and the more than 100 studies it cites—provide a wealth of information,

there for the taking, on how green infrastructure creates real, quantifiable value for commercial property owners.

“I think as developers start to realize that they can have a lot better return on investment, this thing is going to grow,” says McCabe. “But it’s hard work to get someone who’s been digging ponds their whole life to understand that.”

Green infrastructure has much to offer commercial real estate owners and developers. Bringing them on board as partners isn’t just a challenge. It’s an opportunity municipalities, states, and other government entities should step up and embrace.

Author Bios: **Larry Levine** is a senior attorney, and **Paul Davis** is a sustainable finance fellow, at the Natural Resources Defense Council. They are among the co-authors of [*The Green Edge: How Commercial Property Investment in Green Infrastructure Creates Value*](#), a 2013 report highlighting the range of benefits green infrastructure provides to commercial property owners.

[Click here to view the Benefits of Green Stormwater Infrastructure on Private Commercial Property](#)