

on site, but these strategies are typically gray infrastructure, a simple means to manage excess runoff. Rarely are these facilities conceived as places for people.

We contend that this growing necessity to manage stormwater on site poses an intriguing opportunity to transform stormwater management into an on-site design feature. We call this strategy “artful rainwater design”—design that combines the utility of stormwater management with the amenity of rich placemaking focused on the rainwater itself. Some creative landscape architects are seizing this opportunity to create better stormwater management systems while exploiting the placemaking potential of rainwater. To help foster this approach, we have undertaken a selective nationwide case study of 30 projects that are acclaimed for addressing rainwater in ways that are both environmentally responsible and artful. We are finding that the most inspirational designs present a thoughtful and innovative combination of utility and amenity. By “utility” we mean comprehensive and thorough management of excess runoff rate, volume, frequency, and quality. By “amenity” we mean rich placemaking that intrigues, engages, and even educates the visitor about rainwater—a landscape that encourages the visitor to explore what the water is doing, discover how it is being managed on site, and learn about its environmental importance.

Two exciting award-winning projects with entirely different strengths can inform and inspire designers in their own artful rainwater design efforts. One is 10th@Hoyt, an urban apartment courtyard in the Pearl District of Portland, Oregon, designed by landscape architect Steve Koch, ASLA. This courtyard captivates the visitor with its artful display of water conveyance in a quiet, oasislike space, but it addresses the utility of rainwater management less extensively than it could. The other is the Outwash Basin at Massachusetts Institute of Technology’s new Ray and Maria Stata Center in Cambridge, Massachusetts, designed by the Olin Partnership in collaboration with Judith Nitsch Engineering. The design presents a highly innovative rainwater management

## ART FOR RAIN’S SAKE

Designers make rainwater a central part of two projects.

By Stuart Echols and Eliza Pennypacker, ASLA

**W**HEN LANDSCAPE ARCHITECTS hear the term “stormwater management,” what springs to mind: A regulatory demand? A system of pipes and ponds designed to be unobtrusive? Whatever the response,

thanks to revisions to the Clean Water Act, virtually every landscape architect must address stormwater management in virtually every project. As a result, designers are developing many useful strategies for addressing stormwater quantity and quality

A central water channel on axis with the entry gate combines with bilateral symmetry at the 10th@Hoyt courtyard in Portland, Oregon.

STEVE KOCH

## RAIN ART

strategy and breaks new ground in rain garden aesthetics, but it doesn't engage the visitor in its exciting on-site rainwater story. The strengths and weaknesses of these two designs offer the reader a range of ideas to inform future artful rainwater design.

### 10th@Hoyt Courtyard

Walking along a comfortably scaled street in Portland's recently gentrified Pearl District, one glimpses a broad opening in the otherwise continuous building wall. A bronze-colored gate with a motif of rushes offers access to an enticing courtyard. Upon entering the small (8,500 square feet) space one is struck by the simple clarity of the orthogonal composition on axis with the entry. That axis is marked by a vertical copper line running down the face of the five-story building. A seating area of stylish benches is arranged symmetrically around the axis, establishing an air of serene elegance. Oversized black pots surround the seating, each planted with a single shrub; their quiet rhythm defines the central space within the courtyard.

Once the foreground has been absorbed, the visitor's eye goes to the edges—especially up the faces of the building—where intriguing surprises reveal the courtyard rain-



**After flowing down the central stepped runnel, rainwater is pumped over sculptural Cor-Ten fountains studded with button glass and lit from within, above. This particular conveyance system, below, plays hide-and-seek with the plantings, arousing the visitor's curiosity to follow the water.**

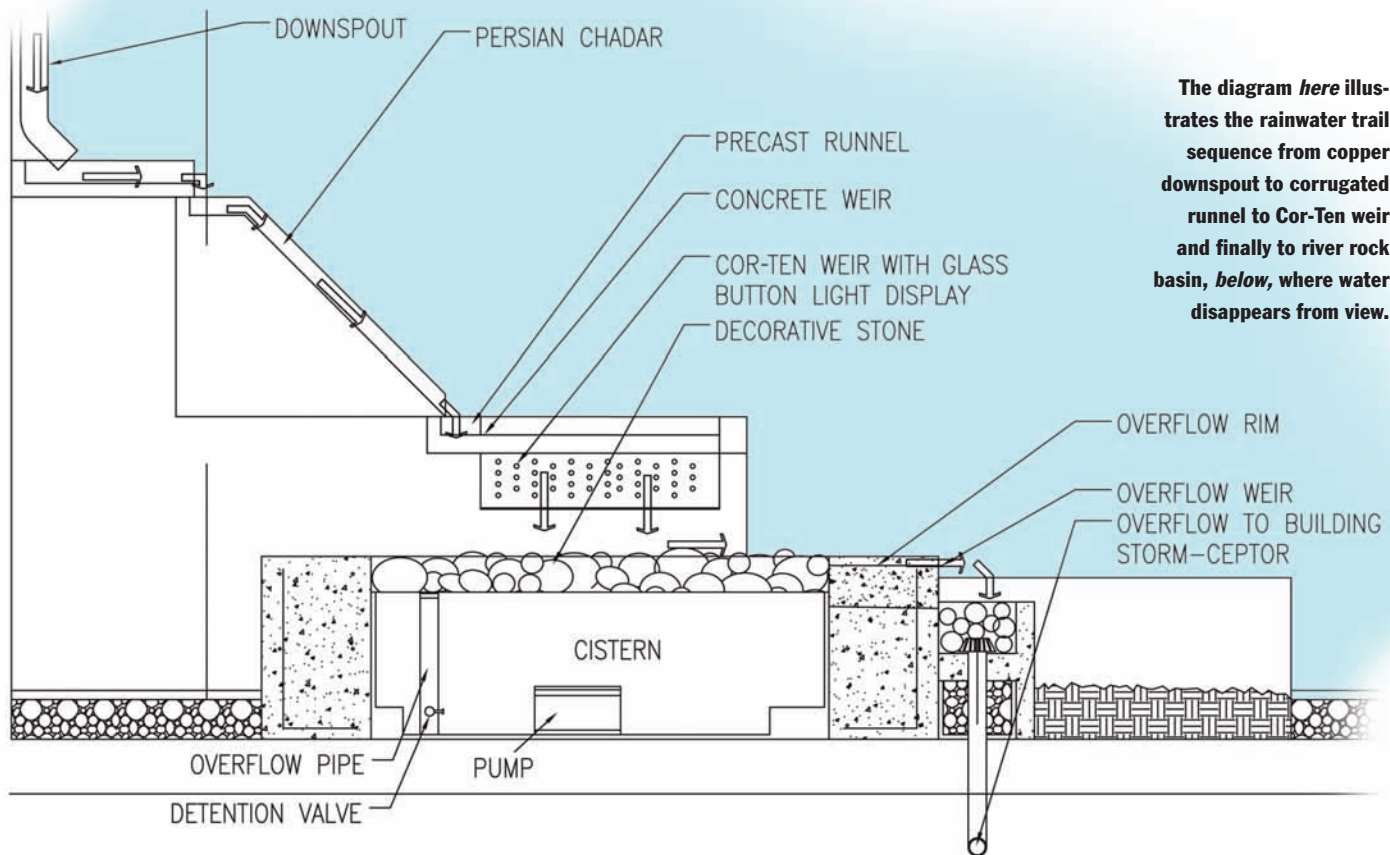
water story. The copper line is a rainwater downspout from the roof leading to a tall, thin, concrete structure that looks like a skinny ziggurat, which in turn steps down to cantilever over a raised concrete basin filled with round river rocks. The system is designed so that rainwater from the downspout runs down the stepped aqueduct and plunges into the rock-filled basin. Other downspouts, tucked into two corners of the courtyard, discharge rainwater to similar stepped aqueducts. Unlike the formal, axial composition

of the first, these two structures zig and zag both horizontally and vertically, looking like refined Rube Goldberg contraptions. Rainwater flows down the runnels of these two aqueducts to wash over Cor-Ten steel level spreaders, which are perforated by colored glass dots and perched over rectangular basins also filled with river rock. The spreaders are lit from below so that the glass dots glow at night. Plantings throughout the space, spare and geometric in arrangement but varied in hue and texture, offer a lush foil to the hardscape. The whole scene presents an inward-oriented, private oasis where one can watch rainwater flow.

Visitors are intrigued by the rainwater system, their curiosity engaged to follow the water trail from one structure to another. One of the great strengths of this design is that people can understand the water path whether it is raining or not—thanks to the “chutes and ladders” conveyance system, one can easily deduce that rainwater movement is the focus of this courtyard. At the same time, the final chapter of the rainwater story appears to be missing at 10th@Hoyt. After its elaborate journey down and into the space, rainwater simply disappears without a trace into the river rock-filled basins. This vanishing act eliminates open water, often considered a hazard to small children in unsupervised areas, but leaves one wondering, “What happened to the rainwater?”



STEVE KOCH, TOP; STUART ECHOLS, BOTTOM



The diagram *here* illustrates the rainwater trail sequence from copper downspout to corrugated runnel to Cor-Ten weir and finally to river rock basin, *below*, where water disappears from view.



What visitors do not know is that, after the system collects rainwater from the building roof and conveys it through the courtyard, the water is then stored in a cistern below grade. The cistern holds up to 4,000 gallons of rainwater for up to 30 hours and slowly releases the runoff to the city stormwater system through a small valve that can be adjusted by hand. At the same time, rainwater detained in the cistern is also recirculated back up to elegant Cor-Ten steel fountains in the courtyard. After circulating through the fountains, water drains back into the cistern, creating a closed loop that runs as long as there is water detained in the cistern. When the cistern is empty, the fountains shut down (and consequently don't run at all during periods without rain). By holding excess runoff up to 30 hours, the system functions as an extended detention facility, allowing time for some sediment to settle out before excess runoff is discharged.

Although the 10th@Hoyt rainwater management system reduces the excess runoff rate, additional stormwater objectives might have been addressed to make its rainwater management even more comprehensive. If rainwater had been used to irrigate the lush courtyard plantings, three other stormwater management issues (runoff quality, frequency,

## RAIN ART



and volume) could also be addressed. These planted areas could be used to filter recirculated rainwater by simply pumping it to the planting beds, then allowing water to drain back into the cistern. The soil and plants would absorb water, reducing both the volume and frequency of water discharged to the municipal system. The runnels and chutes of the captivating conveyance system could even be directed to these planting beds so that residents and visitors could see rainwater being used to sustain the plantings. In addition to these treatment opportunities, one more step could help tell visitors the whole rainwater story: Some diagrammatic signage or visibility into the cistern would allow curious visitors to comprehend the rainwater story from start to finish. In other words, with a few small changes, this project could more

**Native riparian vegetation, river gravel, and granite boulders abstract a New England riverbank in the Stata Center Basin.**

effectively manage runoff and celebrate how its artful design helps protect Portland's precious rainwater resources—a strategy in tune with the city's environmental commitment and the growing ethos of its citizens. In all, though, the 10th@Hoyt courtyard offers an example of artful rainwater design that is particularly strong in addressing the idea of rainwater as an amenity and is quite innovative (though limited) in managing stormwater.

### **Stata Center Outwash Basin**

The Outwash Basin at the Ray and Maria Stata Center on the MIT campus is a sunken garden of native plants, river grav-

el, and granite boulders that control excess runoff rate, volume, frequency, and quality while reusing rainwater in the building. It is by far one of the most innovative and comprehensive stormwater management systems we have encountered to date.

The basin is located in a rectangular, asphalt-coated vehicular and pedestrian corridor—a seemingly leftover campus space surrounded on three sides by multistory campus buildings, where one end opens to an ill-defined parking area and green space. Visitors pass quickly through this outdoor corridor, rarely lingering. Within this gray hardscape, the sunken rectangular Outwash Basin reads as a green object, not as a space. Two adjacent sides of the basin are lined by stepped gabions while the rest of the sloped and sunken garden abstracts a New England riverbank: Planted mounds rise above a curving tumble of granite boulders bordered downslope by a sinuous line of perennials, shrubs, and—in the lowest zone—riparian grasses. Many of the plantings are arranged in strong geometric patterns, contrasting with the naturalistic jumble of boulders and clarifying that this is a human-contrived landscape. Overall the design offers an elegantly presented river abstraction whose major strength is its fresh take on rain garden aesthetics. Rather than the typical profusion of massed plantings found in many rain gardens, this design makes a “water” statement through the river’s edge theme.

With regard to stormwater management, this system is multifaceted and thorough. Rainwater from the Stata Center roof and plaza drains through water quality inlets (drop inlets with filters), where it is filtered and discharged into the sunken Outwash Basin. Two rainwater management systems are at work in the basin.

The upper system comprises a sunken bioretention wetland—the visible “riverbank” landscape of planted mounds and boulders sloping down to the sunken zone of wetland grasses. Retained water lies hidden below the landscaped surface, visible only in the largest of storms. A liner retains the rainwater in this upper system, allowing water to be absorbed by the plantings.

Excess water overflows into the lower management system through holes in the liner (overflow vents). This lower system is an underground water storage vault made of sheets of plastic honeycomb grid, stacked

## RAIN ART

to create structural voids. The vault accepts water from both the upper system and adjacent buildings. A small solar-powered recirculation system pumps filtered water from the vault back up to the bioretention wetland, where it is discharged beneath the gravel on the planted mounds. It then drains, below the surface, down through the wetland system and back to the vault. This recirculation loop provides continuous water filtration while it irrigates the plants. The vault also serves as a water harvesting system, pumping filtered water back up to the Stata Center for use in urinals and toilets.

Last but not least, the entire Outwash Basin sits three feet below the elevation of the municipal storm sewer system; consequently, in large rainfalls excess runoff is pumped up to enter the city system. These pumps are used in conjunction with the storage vault to control discharge rates, volumes, and frequencies.

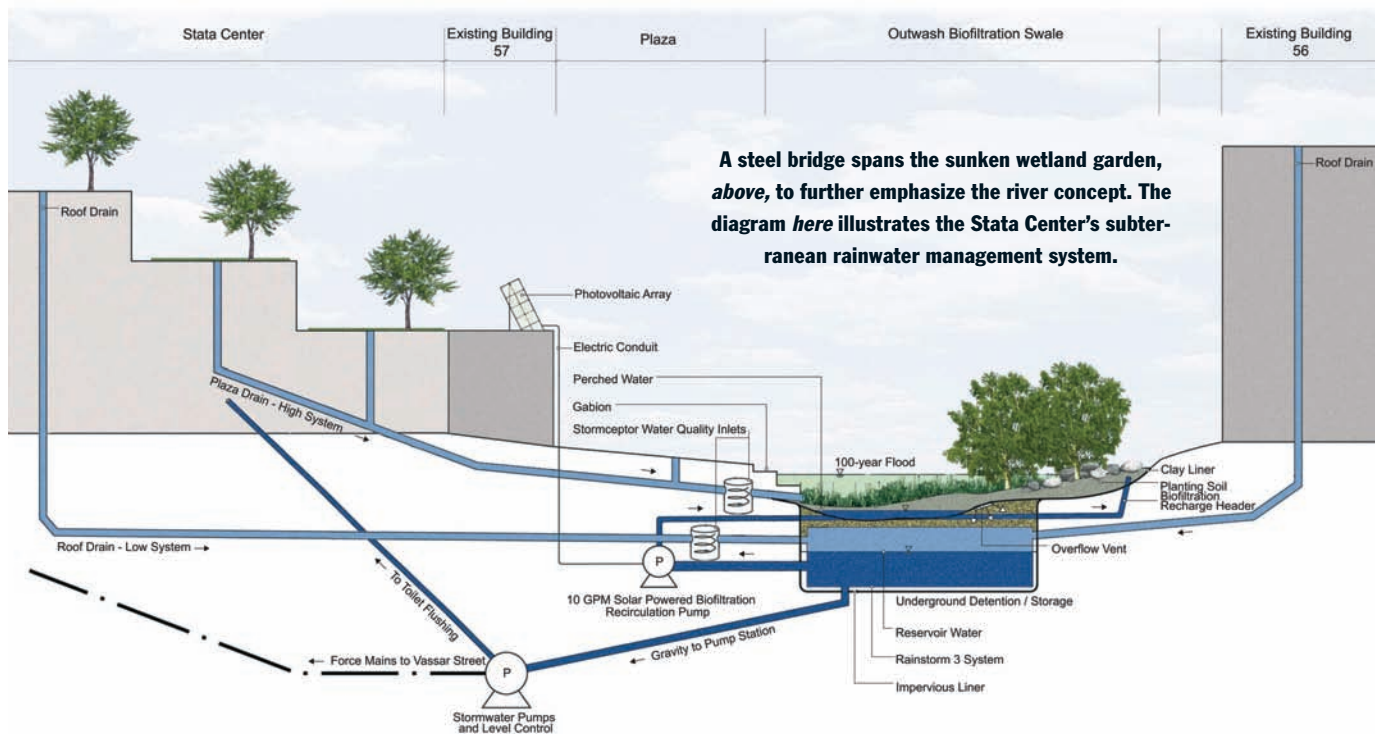


The stormwater utility aspect of this design is extraordinary. Its facilities, working in combination, control the 25-year excess runoff rate at the 2-year predevelopment runoff rate, reduce the volume and

frequency of overflow to the stormwater sewer, control non-point source pollution, and harvest rainwater for reuse in the landscape and building. The stormwater management system of the Outwash Basin at the Stata Center does it all—a comprehensive and innovative system addressing rainwater quality, volume, rate, and frequency.

Unfortunately, all of this exciting activity occurs underground, where it is both out of sight and out of mind. Indeed, the Outwash Basin design offers no visible water at all—as stated earlier, the rainwater management system leaves all water below grade (except in the case of a huge rainstorm). Here lies the missed opportunity of this rainwater design: The fascinating story of on-site rainwater management is wholly invisible. This artfully contrived river abstraction doesn't present any facet of the elaborate

hydrological system. And even if the system were revealed, the basin design does not invite interaction: Visitors are not enticed to enter this sunken garden. To do so, one either would have to invade the planted



STUART ECHOLS, TOP; JUDITH NITSCH, BOTTOM

## RAIN ART



areas or hazard the sharp-edged stainless steel wire encasing the gabions. Nor are people encouraged to sit and ponder this landscape. In fact, there is no obvious seating provided in the design. Instead, the design invites pedestrians to simply walk across a steel mesh bridge over the “river,” the bridge element helping to emphasize the river theme. In sum, the elegantly conceived Outwash Basin neither intrigues nor engages visitors through its on-site rainwater story, nor does it educate them about the comprehensive and thoughtful way that rainwater is managed on this site.

According to MIT campus landscape architect Talitha Fabricius, ASLA, when MIT facilities personnel explain the treatment system on guided campus tours, visitors are intrigued, but few visitors to the site are lucky enough to learn this information. This truly is a missed opportunity—especially at a technology-focused place like MIT. We acknowledge that revelation of the stormwater system may not have been a goal of the Outwash Basin design, but the rich rainwater story on this site deserves to be told and could be accomplished through a range of strategies. Visible water runnels could convey water to the basin from the buildings, the recirculation system could be exposed on the surface so that filtered rainwater would be seen draining through the garden continuously, visible water could flow in the wetland basin, or, simplest of all, a sign diagramming the

**While the rain garden elements suggest an environment shaped by water, the entire rainwater management system functions underground, hidden from view.**

extensive water treatment system could be mounted on the pedestrian bridge.

The 10th@Hoyt courtyard and the Outwash Basin at Stata Center have won multiple awards for their design innovations. Both provide inspirational ideas for artful rainwater design, with contrasting strengths in terms of the defining combination of utility and amenity: The 10th@Hoyt design performs an exemplary job as a rainwater-focused amenity while accomplishing only a portion of the potential range of hydrological utility, while the design of the Outwash Basin at Stata Center accomplishes a remarkably thoughtful and thorough range of hydrological utility but doesn't celebrate the exciting on-site stormwater management story. We propose that artful rainwater design can do both, providing utility and amenity to effectively unite two critical facets of landscape architecture: stewardship of water and land and the creation of engaging, meaningful places for people to experience rainwater.

LAND

*Stuart Echols is a registered landscape architect and an assistant professor of landscape architecture at Penn State University. Eliza Pennybacker, ASLA, is a professor of landscape architecture at Penn State.*