
Conclusion: Some Parting Thoughts

The XYZ Elementary School principal faced a quandary: The town stormwater official wanted the school to eliminate half their parking, because dirty runoff was flowing right through the school's grass-lined detention basin into a creek, degrading the water quality. Impossible! They needed every parking space as it was. She called a landscape architect she knew, and it happened he'd just read a book on Artful Rainwater Design. He knew that this could be a great test of ideas in the book, and he offered to share some thoughts.

First, he reassured the principal, you don't need to touch your parking. Instead, he proposed a green infrastructure retrofit: Create a bioswale filled with native perennials to carry rain from the roof and parking lot to the detention basin; this would cleanse the water and diminish some volume through infiltration. Deepen the basin by about a foot to retain first flush rainwater volume. Plant ribbons of native perennials in the basin, their deep roots helping to filter and infiltrate some of the rain and their linear massings providing the appearance of water flow. Create a dry stream of river rocks marking the path of small to medium flows in the basin, which would slow the water to let it drop sediments while showing that this is a "water place." Add bird houses and stepping stones for access into the new rain garden. Problem solved: The rain is diminished in volume and cleansed before it leaves the basin, but the result is so much more. It's a new outdoor classroom, where kids learn about groundwater recharge, native plants, habitat for birds, bees, and butterflies, and how it all can work together in a beautiful landscape.

The purpose of this book is to help you rethink stormwater management. Regulatory mandates now require that we proactively address both water quantity and quality, but this book shows that by taking an ARD approach, we can accomplish much more. We hope that the preceding pages have

given you plenty of ideas and inspirations so that you, like our fictitious designer in the preceding paragraphs, can create landscapes that manage rain *and* create habitat, experience, and learning—landscapes that make a difference.

But perhaps the most important ideas you can take away from this book are these three:

IDEA 1: PUT THAT LANDSCAPE TO WORK!

This is such a simple idea, but it wasn't until we heard it articulated by civil engineer Steve Benz that we experienced the critical “aha!” moment. Steve's point is simple: In every site design project, landscape is needed for project approval and is valuable (especially in the eyes of you, the designer), but as we know, the components of landscape that the designer considers critical are far too often “value engineered” out of the project to ensure adequate funds for other project priorities. The rationale is often that “we can come back later and beef up the landscape” or “the plants will grow; we can install small ones to save money.” The result, too often, is the loss of opportunity to implement the significant spaces you've designed to promote social interaction, environmental awareness, improved alternative mobility systems, and so on. Instead of performing a meaningful function, that landscape is relegated to providing skimpy parsley around the turkey, “greening up” (but not too much!) the building.

But here's the thing: All that can change *if the landscape performs as a stormwater management system needed for the site development*. As Benz puts it, “Focus on *performative* landscapes: make them work! Then they're essential to the project, and can't be value engineered out.” Wow, what a simple but powerful concept.

So, in your quest to create an ARD—a truly sustainable stormwater management system that also provides an amenity experience—keep the following in mind:

- Take to heart the dictum, “Always slow it down, spread it out, soak it in.” Use the entire site as your sustainable stormwater management system. Disperse that water as much as you can, striving to mimic the kind of site-wide rain capture that occurs in natural landscapes. This strategy accomplishes two important goals: It effectively manages rainwater quantity and quality, and it ensures that every inch of your designed landscape is *necessary* to the project.
- Make sure the stormwater management system really works. Size conveyance and containment carefully (then add some extra capacity), and ensure redundancies so that when that bioretention basin overflows, there's a backup system that sends that water where you want it to go, not into someone's basement. Plan backups for your backups, because the last thing you want is for the system to fail and your client to say, “Well, it looks nice but it doesn't really work.”
- Don't make the system too technically complicated, because complication means more potential spots for the system to fail. Keep the basic system concept simple, with not too many mechanical parts to stop pumping, or clog, or leak, and so on.
- Use green wherever possible for three fundamental reasons. First, you're required by regulations to return stormwater management on this site to some modicum of predevelopment condition;

what better way to do that than to make a *landscape* do the work? If your goal is to emulate a natural landscape's management of rain, isn't it incredibly sensible to create a landscape to do that? This idea is so simple it's almost embarrassing that it's not our typical stormwater management method—yet. Second, by using green infrastructure, the owner and maintenance crews can avoid a lot of headaches caused by underground problems such as clogged pipes and silted catch basins. Green infrastructure keeps the big maintenance tasks on the land's surface—much more accessible to repair and also much easier to spot the problems before they escalate into maintenance nightmares. Finally, there are now plenty of green infrastructure users who report that it's less expensive than gray, whether in construction or life-cycle costs, and the value added can result in significant economic benefit, too. For corroboration, consider the city of Atlanta and Historic Fourth Ward Park. The city claims they saved \$20 million by creating a rain-managing park rather than expanding their sewer tunnels; they also claim that the park has prompted more than \$400 million in private development of land abutting the park (for more information, see the Historic Fourth Ward case study in part 4). Or listen to Tom Liptan, retired environmental specialist at Portland, Oregon's Bureau of Environmental Services. On the basis of his work more than 20 years on green infrastructure in that city, he reports that comparative cost analyses make green infrastructure a clear winner over gray.

IDEA 2: MAKE THE LANDSCAPE OVERTLY CELEBRATE RAIN

We are gratified that people frequently contact us, recommending that we look at a particular stormwater management system for possible inclusion in our case studies. Far too often, though, what we find when we investigate is a design that's an attractive bioswale or a lovely rain garden, not an Artful Rainwater Design. “Wait a minute,” you're thinking, “what's wrong with that?” Well, nothing, except that a stormwater management system simply designed to be a visually appealing landscape misses an incredibly important and timely opportunity: At this point in our environmental efforts, we need to educate people about the value of rain. We need stormwater management systems that clearly and entrancingly celebrate rain to make visitors say, “Look what the rain is doing!” or, “Look! That's *rain*.” We need especially to make people aware of rain's essential role in the hydrologic cycle: “From rooftop to river” and “from parking lot to pond” are the types of messages we need to convey (messages found in so many of our case studies).

Why is this so important? Landscape architect Leo Alvarez put it beautifully in the May 2013 issue of *Landscape Architecture*. In describing a small but elegant ARD he created for his firm's home office, Perkins + Will in Atlanta, he explained, “One of our goals was to make it visible. A lot of these things are great for the environment, but if no one's seeing it, it's not moving the needle.”¹

Our goal at this point needs to be to move the needle, to help the public realize that rain is our essential ally, not an enemy.

So a true ARD unquestionably must be a beautiful landscape: thoughtfully composed, rich in color

and texture. It must be valued for more than treating rain; it must be loved as an environment of value, a place of beauty, because a landscape can be sustained—and thus sustainable—only if people *love* it so that they care enough to retain and maintain that place. So to all the folks who have created sustainable stormwater management systems that are also visually appealing landscapes, we say, “Good work!” The owners of and visitors to those stormwater-managing landscapes have a valuable amenity that we hope will be sustained. But, we respectfully add, next time why not go one step further and really celebrate the rain in that landscape: Surprise, delight, or educate people about rain’s significance. That’s how we’ll move the needle!

IDEA 3: IT CAN’T BE JUST A WORKING DOG OR JUST A SHOW DOG

Okay, the analogy’s not great, but we think you’ll get the idea. There are lots and lots of working dogs who perform valiantly and successfully at their jobs of herding sheep or retrieving ducks or leading the blind. It doesn’t matter what these dogs look like; their value is in their ability to perform a useful function, and their frequent mutt-ness allegedly makes for a better-tempered animal than one with exclusive bloodlines. Then there are the purebred show dogs, some of whom are so painstakingly bred exclusively for their appearance that their behavior is, well, not great, and their working ability is questionable. Get it?

So let’s swiftly abandon the analogy and cut to the point: An effective ARD is neither exclusively a working dog nor a show dog. It must have the strengths of each; it must function very well in its sustainable stormwater management, and it must be attractive to give people the desire to experience and learn from its celebration of rain.

Unfortunately we’ve seen many well-intentioned examples of ARD working dogs and show dogs. We’ve seen municipal engineers thrilled by their implementation of green infrastructure systems that look like weed patches in the urban landscape, and we’ve seen visually stunning rain celebrations that don’t treat rain at all effectively. If we want to move the needle, we can’t afford to create either of these types. Simply put, we must create ARDs that sustainably manage stormwater *and* are clear celebrations of rain. We must create ARDs that people respect for their rainwater management success *and* enjoy for their beautifully presented message that rain is a resource. Anything less is a woefully missed opportunity.

With those three big ideas in mind, let’s now tackle the most common doubts we’ve heard from designers who want to create ARDs but think they can’t.

DOUBT 1: “WELL, THAT’S PORTLAND. WE CAN’T DO THAT HERE!”

Earlier in this book—more than once—we’ve pointed out that Portland, Oregon is not some magical Oz where all the restrictions you face in your geographic locale are somehow moot. Put aside your *Portlandia* imagery and realize that the ARD movement in Portland began because the city faced a CSO crisis: An

urgent necessity was the mother of invention there. So Portland was simply one of the first of more and more municipalities nationwide facing increasingly demanding stormwater management restrictions, and, in Portland crisis led to creativity. Rather than disregarding ARDs in Portland, or any city outside your geographic region, we should learn from them, because we can significantly improve our own ARD success if we take the time to understand both the why and the how of any successful ARD.

DOUBT 2: “YES, BUT HOW DO WE KNOW IT WILL WORK?”

This doubt is very real: Many designers have told us that they want to use green infrastructure, but their clients can't be convinced that this approach will manage rain effectively. But a growing number of projects include postconstruction monitoring (see our case studies in part 4 for many examples). There's also a growing number of projects certified in the SITES program, a voluntary set of guidelines and performance benchmarks for sustainable land design. To obtain SITES certification, projects must be monitored for performance, so SITES-certified projects or case studies provide another useful mine of information. And, as of this writing, the American Society of Landscape Architects also provides very useful data on stormwater case studies nationwide (<http://www.asla.org/stormwatercasestudies.aspx>). In other words, you can explore the performance and stormwater management methods of plenty of existing projects to find the data you need to make a successful case for ARD green infrastructure.

DOUBT 3: “IT’S TOO EXPENSIVE!”

Increasing amounts of data show that green infrastructure can be less expensive than gray. Peruse our case studies for some examples, then explore any of the helpful publications on the subject, including the American Society of Landscape Architects' “Banking on Green: How Green Infrastructure Saves Municipalities Money and Provides Economic Benefits Community-wide” (<http://www.asla.org/ContentDetail.aspx?id=31301>) and the EPA's “Reducing Stormwater Costs Through LID Strategies and Practices” (EPA 841-F-07-006, December 2007, at <http://www.epa.gov/nps/lid>). By the time you read this, many more such resources will be available, so do your homework to help make your financial case for green.

Once you've passed the green infrastructure hurdle, the next one is spending the money to make that green infrastructure a rain-celebrating amenity. Here, consider your client: Schools and even municipalities increasingly seek the public relations benefits of leadership in sustainable initiatives, and private developers can be convinced of the amenity approach by the prospect of good public relations and return on investment. Consider High Point, our case study that uses stormwater management celebration as a branding tool, or 10th@Hoyt, another case study where the apartment building developer is convinced that the courtyard ARD is a signature that made the rental units there fill quickly. If you can convince your client that ARD is a worthy investment in economics, good will, or product branding, you can overcome this doubt.

DOUBT 4: “YES, BUT IT FREEZES HERE.”

This is a common fallback for those in frosty climes, and it is wholly bogus both from a utility and an amenity perspective. Consider the following:

- If you create a green infrastructure ARD, it will function the same way a natural landscape does: Precipitation will freeze and remain in or on the ground until a thaw, and then it will move through the system. It’s that simple.
- ARDs are among the *only* water landscapes where ice can become part of the rainwater celebration. Why? If the rain is conveyed on the surface rather than in pipes, there’s no need to worry about pipes freezing and bursting. Consider the Swarthmore Science Center, one of our part 4 case studies, as an effective example. Here, the designer reports that “freezing was never raised as an issue,” and the resulting “frozen rain” suspended from runnels provides recognition of rain even in winter (figure 5.1).



Figure 5.1. Frozen rain suspended from runnels at the Swarthmore Science Center makes people recognize the significance of rain even in winter (design: ML Baird & Co., Einhorn Yaffee Prescott; photograph: Mara Lee Baird).

DOUBT 5: “MAINTENANCE IS TOO MUCH TROUBLE.”

Getting the maintenance crew onboard with your ARD function and intentions can be challenging, but it's often a matter of education and creative teamwork. Taking the time and energy to do this really makes the difference between a long-term success or a failure in your ARD. The case studies in part 4 offer some simple and some creative approaches:

- The designers of the Dell made the maintenance crew part of the team by meeting with them to clarify the project's maintenance requirements.
- At High Point, a different approach was taken to team-building: Contractors were informed of the sustainable intentions of the place at the outset and invited to make suggestions, which they did, resulting in some very useful refinements and additions to the planned strategies. In some contexts, this could be a great strategy for the maintenance crew. There's nothing like getting people invested in something with noble intentions and encouraging their creative input as part of the team.
- To minimize confusion about intentional plants and invaders, designers of a number of the case study projects planted on a grid or other obvious pattern to make weeds easy to spot, or they planted especially lushly (increasing size or number) to crowd out weeds.
- All stormwater management systems need maintenance, some more extensive than others. To keep an ARD looking the way visitors and neighbors typically prefer landscapes to look (we Americans tend to expect tidy landscapes!),² ensure that the maintenance regimen is frequent enough to keep it looking well tended. You don't want local homeowners to see your ARD as a feral eyesore of unkempt, overgrown, tangled plants.
- Be particularly careful of the planting palette. ARDs that we predict will stand the test of time—and plant growth—share some important characteristics: The plants at mature size fit comfortably within the green infrastructure system, and the plants won't acquire a very leggy or floppy character (which the average American sees as undesirably “unkempt”).

In sum: Yes, at this point in our sustainable design history, ARDs pose many challenges, but don't let those challenges prevent you from pursuing this extremely functional, educational, and exciting approach to stormwater management. Anticipate the challenges and creatively prepare to address them.

And so with all the preceding pages—the examples, ideas, questions, rebuttals, and resources—we encourage you to make ARD the future strategy of your stormwater management systems. Recognize today's increasingly stringent stormwater treatment regulations as an exciting opportunity rather than a burden. The fact is that we have to manage rain; doing nothing is not an option. Let's be smart and opportunistic by managing rain in ways that accomplish other goals, from education to beautification to stimulating surrounding development to creating green jobs. Let's be smart and let soil and plants do the stormwater management work for which they're so perfectly suited. Let's provide a huge public service by “moving the needle,” teaching people to revere rain as the life-giving resource that it is.

As a final thank you to the designers who have created the design innovations that inspired this book, we offer this narrative from a 1997 Apple ad (<https://www.youtube.com/watch?v=8rwsuXHA7RA>), used in their “Think Different” campaign:

“Here’s to the crazy ones: the misfits, the rebels, the troublemakers, the round pegs in the square holes—the ones who see things differently. They’re not fond of rules. You can quote them, disagree with them, glorify or vilify them, but the only thing you can’t do is ignore them because they change things—they push the human race forward.”

NOTES

1. Jonathan Lerner, “The Last Drops,” *Landscape Architecture* 2013 (5): 60.
2. For an exploration of this topic, see Eliza Pennypacker, “What Is Taste, and Why Should I Care?,” *Proceedings of the 1992 International Conference of the Council of Educators in Landscape Architecture* (Washington, DC: Landscape Architecture Foundation, 1992): 63–74.

Artful Rainwater Design Project List

Name	Location	Designer
Arizona State University Polytech Campus	Mesa, AZ	Ten Eyck Landscape Architects, Inc.
Underwood Sonoran Landscape	University of Arizona, Tempe, AZ	Ten Eyck Landscape Architects, Inc.
Pacific Cannery Lofts	Oakland, CA	Miller Company Landscape Architects, David Baker Architects
Rodgers School	Stamford, CT	Mikyong Kim Design
Washington Canal Park	Washington, DC	OLIN
Southwest Recreation Center Expansion	University of Florida, Gainesville, FL	RDG Planning and Design
1315 Peachtree	Atlanta, GA	Perkins+Will
Historic Fourth Ward Park	Atlanta, GA	Phase I: HDR; Phase II: Wood+Partners
Lamar Dodd School of Art	University of Georgia, Athens, GA	Ecos Environmental Design
International Student Center Rain Garden	Kansas State University, Manhattan, KS	Department of Landscape Architecture/Regional & Community Planning, KSU
Outwash Basin at Stata Center	Massachusetts Institute of Technology, Cambridge, MA	OLIN; Nitsch Engineering
Maplewood Rain Gardens	Maplewood, MN	Joan Nassauer et al.
Queens Botanical Garden	Queens, NY	Atelier Dreiseitl with Conservation Design Forum; BSKS Architects
10th@Hoyt	Portland, OR	Koch Landscape Architecture
The Ardea	Portland, OR	Mayer/Reed
Atwater Place	Portland, OR	Mayer/Reed
Buckman Heights	Portland, OR	Murase Associates
Gibbs Street Bridge	Portland, OR	Mayer/Reed
Glencoe Elementary School	Portland, OR	Portland Bureau of Environmental Services
Headwaters at Tryon Creek	Portland, OR	Greenworks
Howard Hall, Lewis and Clark College	Portland, OR	Walker Macy

Name	Location	Designer
Mount Tabor Elementary School	Portland, OR	Portland Bureau of Environmental Services
New Seasons Market Arbor Lodge	Portland, OR	Lango Hansen Landscape Architects PC; Ivan McLean
New Seasons Market Seven Corners	Portland, OR	Portland Bureau of Environmental Services
Oregon Museum of Science and Industry	Portland, OR	Murase Associates
Rain Garden at the Oregon Convention Center	Portland, OR	Mayer/Reed
Rigler Community Garden Gazebo	Portland, OR	Liz Hedrick
RiverEast Center	Portland, OR	Greenworks; Group MacKenzie
Siskiyou Green Street Project	Portland, OR	Portland Bureau of Environmental Services
Stephen Epler Hall	Portland, OR	Atlas Landscape Architecture; KPFF Consulting Engineers; Mithun
Southwest 12th Avenue Green Street	Portland, OR	Portland Bureau of Environmental Services
Southwest Montgomery Street	Portland, OR	Nevue Nguyen
Tanner Springs Park	Portland, OR	Atelier Dreiseitl with Greenworks
Water Pollution Control Laboratory	Portland, OR	Murase Associates
Taylor Residence	Kennett Square, PA	Margot Taylor
Liberty Lands Park	Philadelphia, PA	Pennsylvania Horticultural Society and CH2MHill
Salvation Army Kroc Center of Philadelphia	Philadelphia, PA	Andropogon Associates Ltd.
Shoemaker Green	Philadelphia, PA	Andropogon Associates Ltd.; Meliora Design LLC
Springside School Rain Wall and Gardens	Philadelphia, PA	Stacy Levy
Center for Sustainable Landscapes	Phipps Conservatory, Pittsburgh, PA	Andropogon Associates, Ltd.

Name	Location	Designer
Swarthmore Science Center	Swarthmore, PA	ML Baird & Co.; Einhorn Yaffee Prescott
Ridge and Valley	The Arboretum at Penn State, University Park, PA	Stacy Levy with MTR Landscape Architects; Overland Partners
Automated Trading Desk	Mount Pleasant, SC	Nelson Byrd Woltz Landscape Architects; Tinmouth Chang Architects
Ladybird Johnson Wildflower Center	Austin, TX	J. Robert Anderson Landscape Architects; Overland Partners
The Green at College Park	University of Texas, Arlington TX	Schricket, Rollins, and Associates
Belo Center for New Media	University of Texas, Austin, TX	Ten Eyck Landscape Architects, Inc.
Manassas Park Elementary School	Manassas Park, VA	Siteworks LLC
Campbell Hall Renovations	University of Virginia, Charlottesville, VA	Nelson Byrd Woltz Landscape Architects
The Dell	University of Virginia, Charlottesville, VA	Nelson Byrd Woltz Landscape Architects
South Lawn Commons “water circuit”	University of Virginia, Charlottesville, VA	Office of Cheryl Barton
Cedar River Watershed Education Center	North Bend, WA	Jones and Jones
Waterworks Garden	Renton, WA	Lorna Jordan
2nd Ave Edge Street (SEA Street)	Seattle, WA	Seattle Public Utilities
110 Cascade	Seattle, WA	Seattle Public Utilities
Growing Vine	Seattle, WA	GAYNOR, Inc.; Carlson Architects; SvR Design Company; Buster Simpson
High Point	Seattle, WA	SvR Design Company; Mithun; Bruce Meyers
Pierce County Environmental Services	University Place, WA	Bruce Dees & Associates; SvR Design Company; The Miller Hull Partnership
Washougal Town Square	Washougal, WA	GreenWorks; Sienna Architecture Company, Inc.; Ivan McLean

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