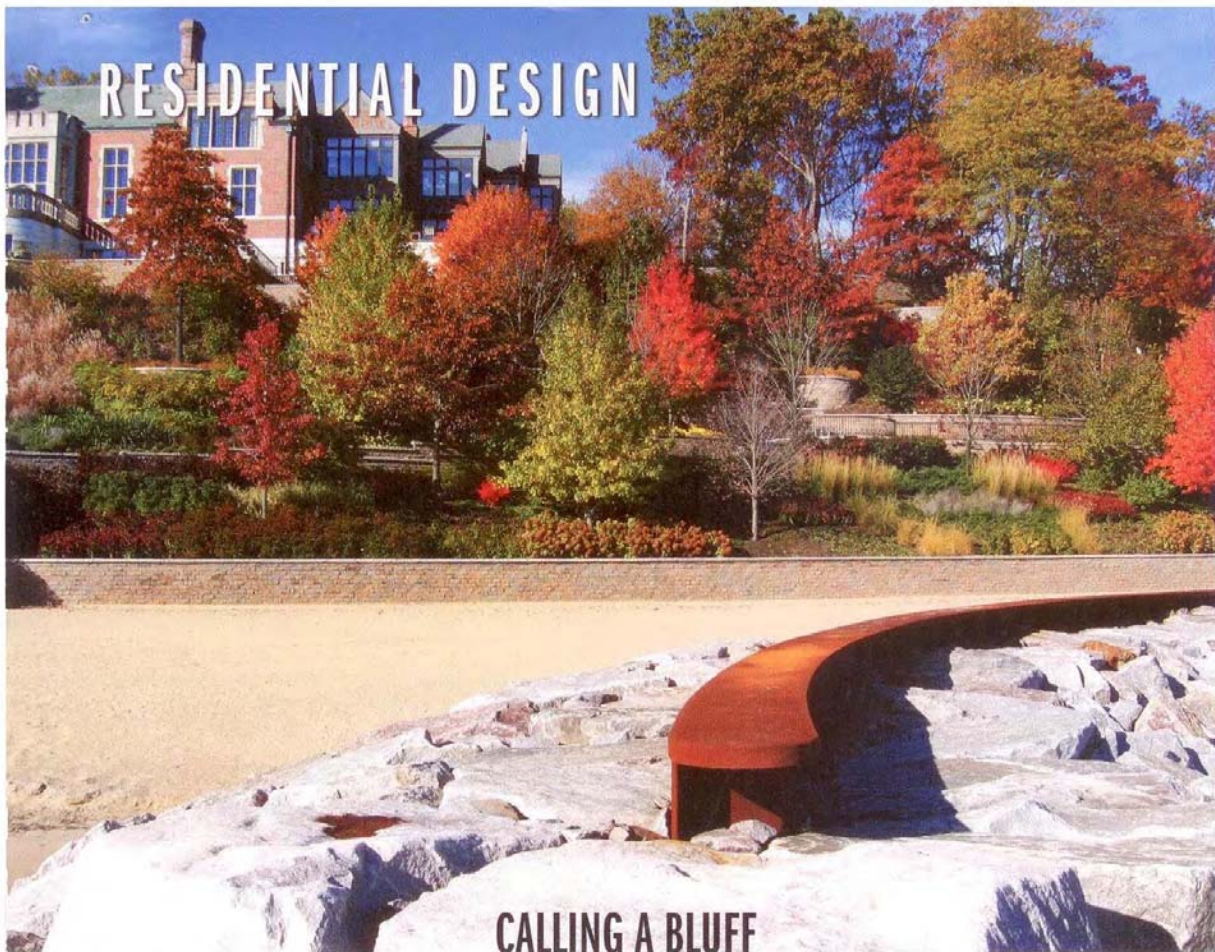


# RESIDENTIAL DESIGN



## CALLING A BLUFF

A Chicago-area landscape architect seeks to stabilize and restore a degraded slope—by removing all the trees. **By Adam Regn Arvidson, ASLA**

**T**HE LAKE MICHIGAN SHORELINE north of Chicago is known (appropriately) as the North Shore. It's a beautiful, almost arrow-straight strand that looks east across water seemingly vast as an ocean. It has significant topography: a ravine-laced highland ending in an abrupt bluff that offers expansive un-Midwestern views. The bluff, due to the natural processes of wave action and groundwater movement, has been gradually eroding into the lake for thousands of years. That wouldn't be a problem if no one lived here.

But the North Shore includes some of the wealthiest towns in the nation: Kenilworth, Evanston, Highland Park, Lake Forest. It is a stretch of ultra-high-end real es-

tate, complete with European-style mansions, twisting leafy streets, and monumental gatehouses. It is the playground of entrepreneurs, CEOs, and celebrities. So eroding bluffs, natural or not, are a problem.

For many years, trees have been the answer for most North Shore communities. Strict ordinances have forbidden the removal even of invasive buckthorn, for fear that elimination of soil-grasping roots would cause massive California-style landslides. It

was a bit of a departure from the norm, then, when one owner in Lake Forest decided to defy local codes and denude his lakeside bluff—in the dual interests of creating usable space and stabilizing the slope itself.

This Lake Forest Estate was designed by Nancy Hannick, ASLA, who works solo from her Highland Park, Illinois, home under the moniker NLH Landscape Architects. She was recommended to the client by Charles Shabica, a bluff, shoreline, and

**All along the edge of Lake Michigan north of Chicago, high bluffs are slowly eroding into the water, which threatens the high-end homes perched atop them. At one such estate in Lake Forest, NLH Landscape Architects replaced degraded forest with an Italian villa-inspired landscape.**



New pathways descend the slope to a terrace atop a boathouse, *above*. Stabilizing the slope required the controversial removal of nonnative trees, *below left and below right*; extensive in-slope piping, *below center*, and geotextile wicks; and an annual blanketing of the entire bluff, *left*.

ravine stabilization expert who was working on the estate's waterfront. Hannick produced the first master plan for the project in 1997 and has spent the past decade implementing, tweaking, and adding to that design. Her efforts garnered her a 2006 Honor Award from Illinois ASLA.

The 9,100-square-foot home sits right at the edge of the bluff, its English-manser-inspired bulk peeking from an overgrown forest studded with a few higher-quality oaks. There are bluestone terraces on both



sides and a lower terrace on the lake side that begins a steep but engaging descent to a boathouse (also designed by Hannick) at the foot of the bluff. Between the boathouse and the lake is a wide beach, stabilized by low curving sheet-pile and rock walls designed by Shabica.

Hannick struggled a bit with how to design literally on a bluff, but she saw some precedents halfway around the world. "It was during several trips to Lake Como [in Italy]," she explains, "that I saw how to work with this bluff not as a detriment but as a wonderful asset. I visited gardens like the Villa d'Este and realized they had done this before, so my idea of traversing the slope would work here in Illinois." The primary traverse from the home down to

**"I visited gardens like the Villa d'Este and realized... my idea of traversing the slope would work here in Illinois." —Nancy Hannick**

the beach was the first thing constructed, in 1999. It plunges down through three switchbacked stair flights then descends farther on a straight run of stairs that slides northward, away from the house. From there, the path reverses course and descends gently to the roof of the boathouse, where a formal garden and arbor are punctuated with two large honey locusts. Later, a second walkway was built that stretches even farther north, providing a secluded view point.

During the journey down from the house, the pathway moves in and out of copses of trees, hiding and revealing the lake and creating both warm sunny and cool shady stretches. The walls along the stairs and pathway are of modular concrete block, chosen due to the precarious nature of the bluff (the first phase was built by workers lowering blocks down the slope in wheelbarrows). Wall caps and stair and pathway surfaces are Lannon stone. Occasional wrought-iron railings tie the landscape back to the aristocratic character of the house.

These switchbacks and walled walkways are nestled into a restored landscape of primarily native trees, shrubs, and perennials, all of which were chosen for their ability to withstand the harsh conditions adjacent to the great lake: later spring warm-up, a longer fall, and intense winter winds. The owner was interested in having the landscape look mature right away, so large trees were brought to the site on a barge and set in place by crane (with Hannick hanging from the basket to direct precise location). Sugar and red maples, serviceberries, hawthorns, and oaks are joined by witch hazel, viburnum, stephanandra, and spirea. Perennials include yarrow, aster, daylilies, coneflowers, and salvia (see "Slope, Ravine, and Beach Restoration," page 112).

The overall effect is one of intricacy and formality. This is not a contemporary design, and it was never intended to be. The modular block has a rough, stonelike character that veers toward the classical, with the railings and stone caps completing the motif. The walkways have long straightaways and gentle curves that give the design a monumental scale. The boathouse roof draws directly from the aesthetic of the main house, while the upper terraces are a creative hybrid of English manor garden and Italian villa.

That said, though the modular concrete block was certainly the right choice for constructability and character, the color—a swirled dark gray and pink—matches poorly with the elegant Lannon stone caps and treads. It seems just a bit off the shelf relative to the quality of the rest of the design.

The real meat of Hannick's labor of love, however, isn't the careful stair, walk, and wall grading, the naturalistic landscape plan, or the selection of materials. It is that she accomplished all this in the context of a highly technical and innovative slope stabilization—that is completely buried.

Initial soil borings revealed a series of sand lenses that were moving water out of the face of the bluff. Cracks in the soil at the top of the bluff near the house were a sure sign of instability. As Shabica puts it: "We had water coming out the sides of the bluff, water coming over the top of

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the bluff, and waves at the bottom." It was at that point that wholesale reengineering of the slope became necessary.

Sheet pilings were driven at the top of the slope near the house and at the bottom. Another line of sheet pile was installed later when the terrace on the lake side of the house was built. The bluff, by this time, was completely denuded. Mass excavation was taking place to accommodate geogrid for the modular retaining walls. This had the additional benefit of adding significant granular material to the bluff, which helps water drain downward rather than out the face of the slope. To further move water through the soil, long collection tubes were drilled vertically and horizontally into the slope from several outlet points. These were stuffed with geotextile wick drains and connected together, so water would empty into the lake rather than create new ravines in the bluff face.

The tree removal was the risky part. There is a catch-22 in bluff restoration with regard to trees. Large trees eventually shade the ground so deeply that the soil-hugging shrubs and perennials die off, leaving the

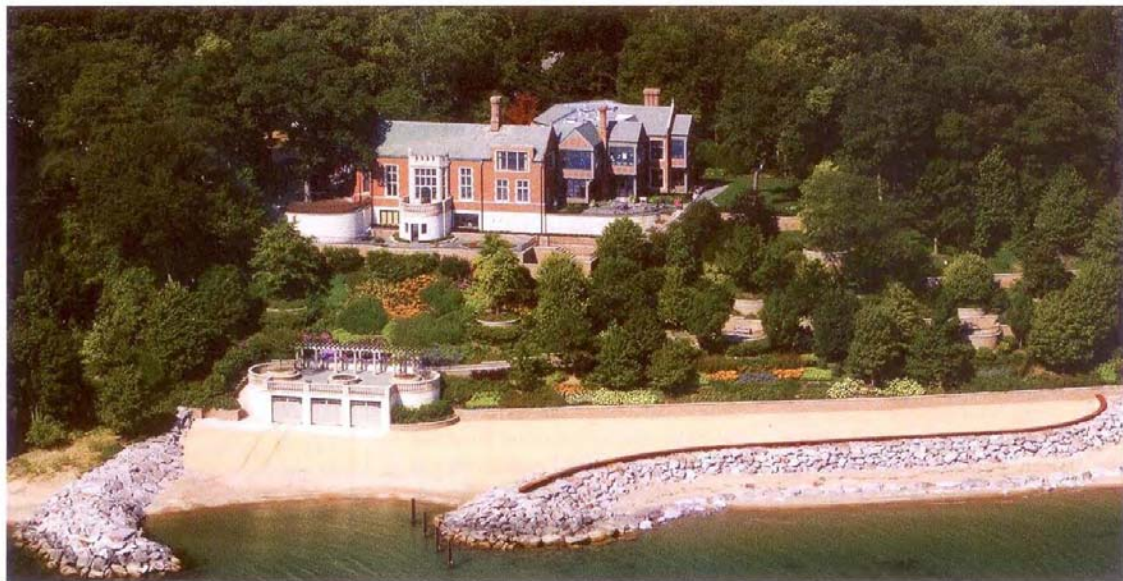


**The restoration of the bluff created usable space above, below, and on the slope, which was replanted with native shrubs, perennials, and trees, below. An arbor atop the boathouse, above, serves as a gateway for walks traversing the slope.**

earth exposed to erosion. Trees do, however, intercept some water before it reaches the ground and do themselves hold soil. But when the forest is a tangled mass of invasives and native trees hanging on to eroding

soils for dear life (like both of the Lake Forest Estate's next-door neighbors'), there does seem little value in keeping it around. The owner, for his part, invested in making sure his bluff would be better off for the tree removal. The slope is now a mass of perennials that blanket the soil almost completely and are busy growing deep roots. And each winter from 1998 to 2003 (when the last of the landscape was installed), he paid to have the entire denuded slope covered with an erosion control blanket.

**"Taking the trees off the bluff was the only way to properly stabilize it." —Charles Shabica**



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Normally, according to Shabica, a native bluff would not have any trees at all. They would not have been able to survive the harsh environment of erosion and collapse. "When we see wooded lakeshore [here on the North Shore bluffs]," he says, "that is a result of human habitation." Which, he believes, isn't necessarily wrong. And the client wanted trees. But from time to time, the understory needs to be rejuvenated, which can't happen in the shade of a tangled forest. "Taking the trees off the bluff," he states, "was the only way to properly stabilize it."

Shabica also says the trees-first philosophy is beginning to change. He has taken part in a symposium at the Chicago Botanic Garden (which is located in the North Shore region) on proper restoration of bluffs and ravines. He published an article on what he calls "the Illinois Experiment" in *Shore & Beach*. And his wife sits on the forestry commission of North Shore community Winnetka—so perhaps there are applicable ears being bent.



Much of the innovative stabilization techniques happens below the surface. Horizontal and vertical wicks made of geotextile fabric move water through the slope in a predictable way, rather than allowing it to run over the face of the bluff. This ensures that the plants can anchor the surface of the soil, preventing further erosion.

## Slope, Ravine, and Beach Restoration

**C**HARLES SHABICA grew up around the ocean and now makes his living as a practicing coastal engineer. He has degrees in geology and evolutionary biology and even worked at Woods Hole Oceanographic Institute. His Chicago-area-based firm, Shabica & Associates Inc., has been tackling shore, bluff, and ravine restoration projects for more than 20 years. When it comes to these fragile, dynamic environments, Shabica stresses the importance of understanding current conditions and not attempting a restoration of a historic environment. "We have to recognize," he says, "that things are not as they were back in the Garden of Eden days. If we restore [a landscape] to what it was then, it won't work, because we are working with a changed environment." He means an environment changed by humans and likely featuring more runoff, different storm frequencies and intensities, and even temperature changes due to global warming.

He has some advice for landscape architects faced with projects involving shore, ravine, or bluff restoration and stabilization.

**SHORELINES.** For large projects (say, an entire Gold Coast community), Shabica may build a physical model of the shoreline, then use a computer-driven wave machine to test different design ideas in different types of hydraulic conditions. For smaller projects, he relies on a numerical model that exists entirely within a digital environment. In any case, he recommends such modeling as a critical step in understanding the dynamic nature of shoreline waves. It could be the difference, he says, between an over-designed pile-of-rocks breakwater and a lower, simpler solution like that at the Lake Forest Estate. Aside from being less of an intrusion on the ecology and aesthetics of the shore, such a solution may also cost a lot less.

**RAVINES.** The ravines of the Gold Coast developed and stabilized just after the last ice age, making them what Shabica calls "relic environments." They are home to plants typically found in more northerly climates. Today, these ravines see a lot more water than they once did. The answer, he says, is to look to other, higher velocity streambeds, such as mountain trout streams, which tend to be much rockier. "In the 1990s," he recalls, "we started doing ravine restoration through reintroduction of streambed armor." At the time, he assumed rectilinear

blocks would work best, since they would lock together. But, through experience, he learned that rounded boulders placed in key locations are best. They allow for stability of the ravine in both high- and low-flow situations (the blocks are less conducive to plant growth), and they create riffles and plunge pools that oxygenate the water. He also often builds wetlands at the feet of ravines, to further filter water before it enters Lake Michigan (something that also would have occurred historically).

**BLUFFS.** "Vegetating a bluff," says Shabica, "is very different from vegetating a hill." Bluffs are by their nature quasi-stable environments that are extremely susceptible to erosion by water flowing over and through them. Even a clog in an irrigation system at the top of the bluff can put enough water down into the soil layers to cause the slope to weaken

and slide. The key, as is well demonstrated at the Lake Forest Estate, is to move water in predetermined pathways down through the bluff to its base. Without such a drainage network, water will likely blow out of the face of the bluff somewhere, then will erode the fragile soil beneath that blowout. Also important is revegetating the bluff with shrubs and perennials that will hold the soil and dissipate the energy of falling rain. That, as at the Lake Forest Estate, may require removing existing trees, something Shabica says is often justified, since these bluffs would have historically been mostly devoid of them anyway.

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But if native bluffs were generally tree free, why support the reintroduction of trees? Won't those oaks and maples grow up and shade out the black-eyed Susans? Won't Hannick and the owner of the Lake Forest Estate one day have to start all over again? Both Hannick and Shabica respond that one critical element of the landscape is the client. The owner wanted trees. Forested Lake Michigan bluffs have become the look of the North Shore.

And though it would be hard to suggest that this project, in this location, be (in the interest of true bluff restoration) devoid of trees, it probably doesn't need to be irrigated. Yes, the bluff is adorned with an irrigation system. The complex drainage network, certainly, will prevent watering from having an erosive effect on the slope itself, but adding more water to an already fragile system seems counterintuitive. Most of these plants were selected for their ability



to withstand natural bluffside conditions, so why must they be watered? What a statement could have been made if this bluff were native dominated, innovatively stabilized, and unirrigated.

**The walks and supporting walls are constructed of modular concrete, above and opposite, which allowed for easier construction and better addresses natural water seepage.**

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The Lake Forest Estate is an elegant project. Its carefully designed walkways simultaneously address complex grade changes and create comfortable spaces. Its many terraces are well-crafted references to

English and Italian design: One has a boxwood parterre; another tucks into the shade of a preserved and coddled signature oak. The detailing, overall, successfully addresses constructability and even at times adds

a little whimsy (the white-flowering south terrace sports a "tree man" wall fountain designed by Hannick). The use of many native plants is to be commended—even though these are accompanied by a wide palette of ornamentals. The drainage interventions are effective and innovative and may (owner willing) become a regionwide case study. The project proves that the state of the art in bluff stabilization can be clad in classic European style. That's likely to play well on the North Shore.

*Adam Regn Arvidson, ASLA, is interim editor of Landscape Architecture.*

**PROJECT CREDITS** **Landscape architect:** NLH Landscape Architects, Highland Park, Illinois (Nancy Hannick, ASLA, lead designer). **Beach and shoreline consultant:** Shabica & Associates Inc., Northfield, Illinois. **Geotechnical engineer:** Giles Engineering Associates Inc., Waukesha, Wisconsin. **Structural engineer:** Brunzell Associates, Skokie, Illinois. **Landscape contractor:** The Fisher Burton Company, Wauconda, Illinois.

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