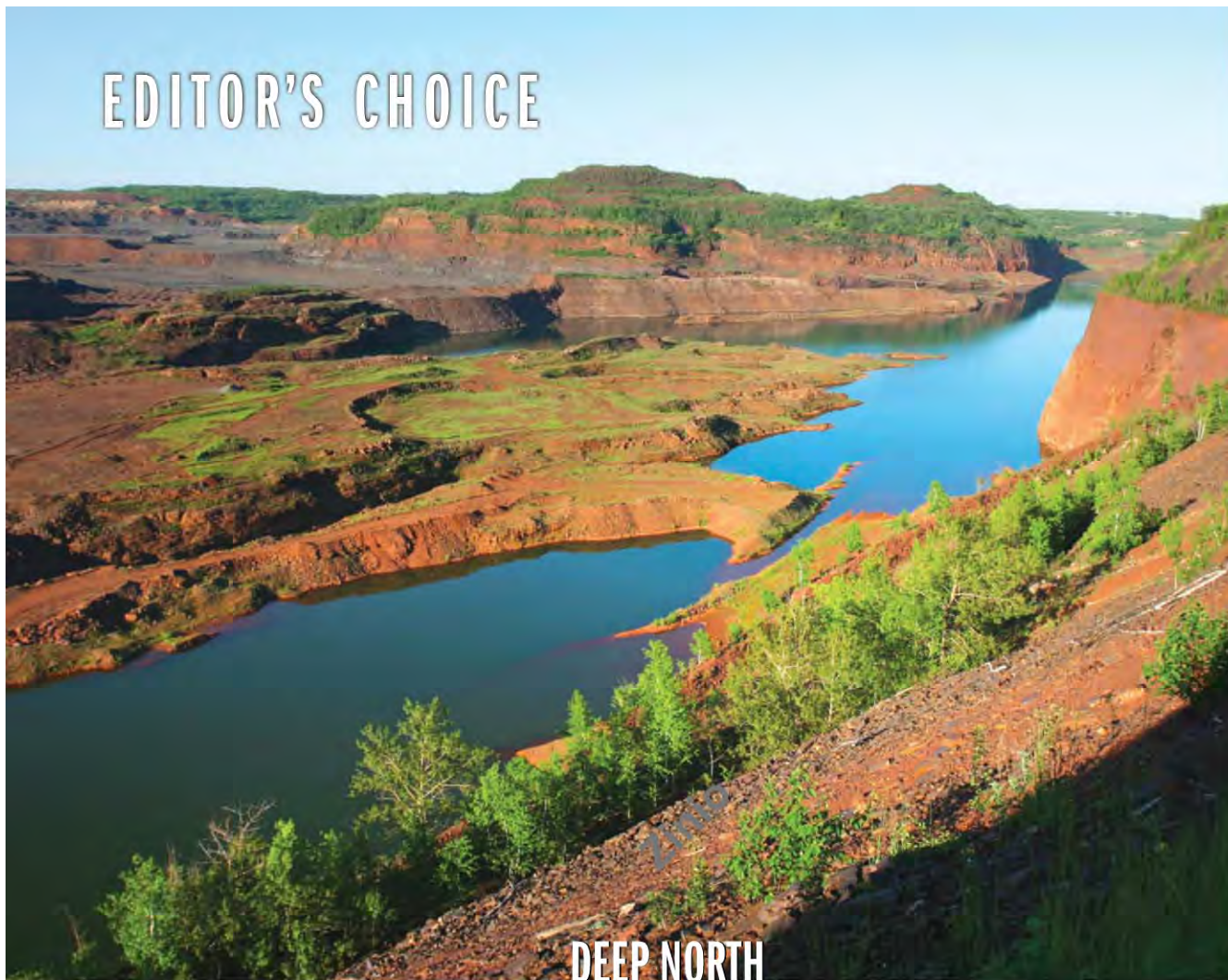


EDITOR'S CHOICE



DEEP NORTH

IN 1919 THE TOWN OF Hibbing, Minnesota, was in the way of iron. So, over the next two years, at the behest and expense of the Oliver Mine Company, 185 homes and 20 businesses were moved two miles south. New civic buildings were erected around the relocated structures, and the old town became North Hibbing, which gave up the ghost in 1968 when the last remaining house was moved off its foundations. Today, most of the original town site has been consumed by the three-mile-long, 500-foot-deep Hull Rust Mine, shown above, which has relinquished about 1.2 billion tons of ore and waste rock during its 113-year history.

Such is life on Minnesota's Iron Range, where the surface landscape can seem like a temporary skin for the riches that lie beneath. It's a place where ownership maps come in sets of two—one for the owner of the visible surface of the land, one for the holder of the rights to the minerals below. In the early part of the century some residential

Can landscape architects help create a more constructive future for northern Minnesota's vast open-pit mines?

By Diane Hellekson, ASLA

Beautiful and scarred: This inactive portion of the Hull Rust Mine outside Hibbing, Minnesota, typifies the steep slopes and lakes that occur after minimum reclamation standards are implemented.

communities were called not towns but “locations,” which, rather than move, would simply fade away whenever the nearby ore ran out.

Since the late 19th century, the landscape of the Mesabi Range (the largest of three iron-rich areas of Minnesota) has been shaped by mining companies—lately, U.S. Steel, United Taconite, Northshore, and ArcelorMittal—and the generations of Italians, Slavs, Finns, and other immigrants who worked there. The shapes they made often became beautiful, deep-blue pit lakes and mountains of waste rock, grown over with aspen and pine.

In the past eight years, another sort of land shaper has emerged on the Iron Range: the landscape architect. A small, dedicated group of landscape architects and other designers, invited to the region by a mine executive with a longer-range view than most, saw that while the dramatic landscape of the range was beautiful, it was also scarred. Mining practices had made lakes that

GERRY SIBELL

EDITOR'S CHOICE



were inaccessible to humans and challenging habitat for wildlife, as well as steep ziggurats of earth unsuitable for building and difficult to revegetate. Future mining, depending on global demand for iron and technological advances in extracting it, could disrupt roads and the edges of cities.

The landscape architects wanted to help range citizens imagine what their towns and open spaces could look like in the future, which may or may not include mining, and facilitate those visions taking shape on the ground by partnering with the most powerful players in the region: the mining companies.

The result is the Laurentian Vision (LV) Partnership, named for the continental divide that slices across northern Minnesota and parallels some of the richest iron deposits in the country. It is a coalition of stakeholders from all realms of Iron Range life: residents, mine staff, state and local government employees, and, when funding allows, designers organized by the University of Minnesota (U of M) Department of Landscape Architecture. Rather than reclaim individual abandoned mines, the landscape architects want to use mining processes to reshape the land as the mining occurs. In three design charrettes, held in 2001, 2003, and 2007, landscape architects worked with mine engineers, Minnesota Department of Natural Resources (DNR) staff, and varied stakeholders to help coax out ambitious ideas about how mine lands could eventually contribute to the regional ecology and economy and lay the groundwork for

The Minorca East Reserve pits and stockpiles are shown as they will appear between now and 2018, just outside the town of Biwabik, Minnesota, population 830.

recreational amenities and needed new housing.

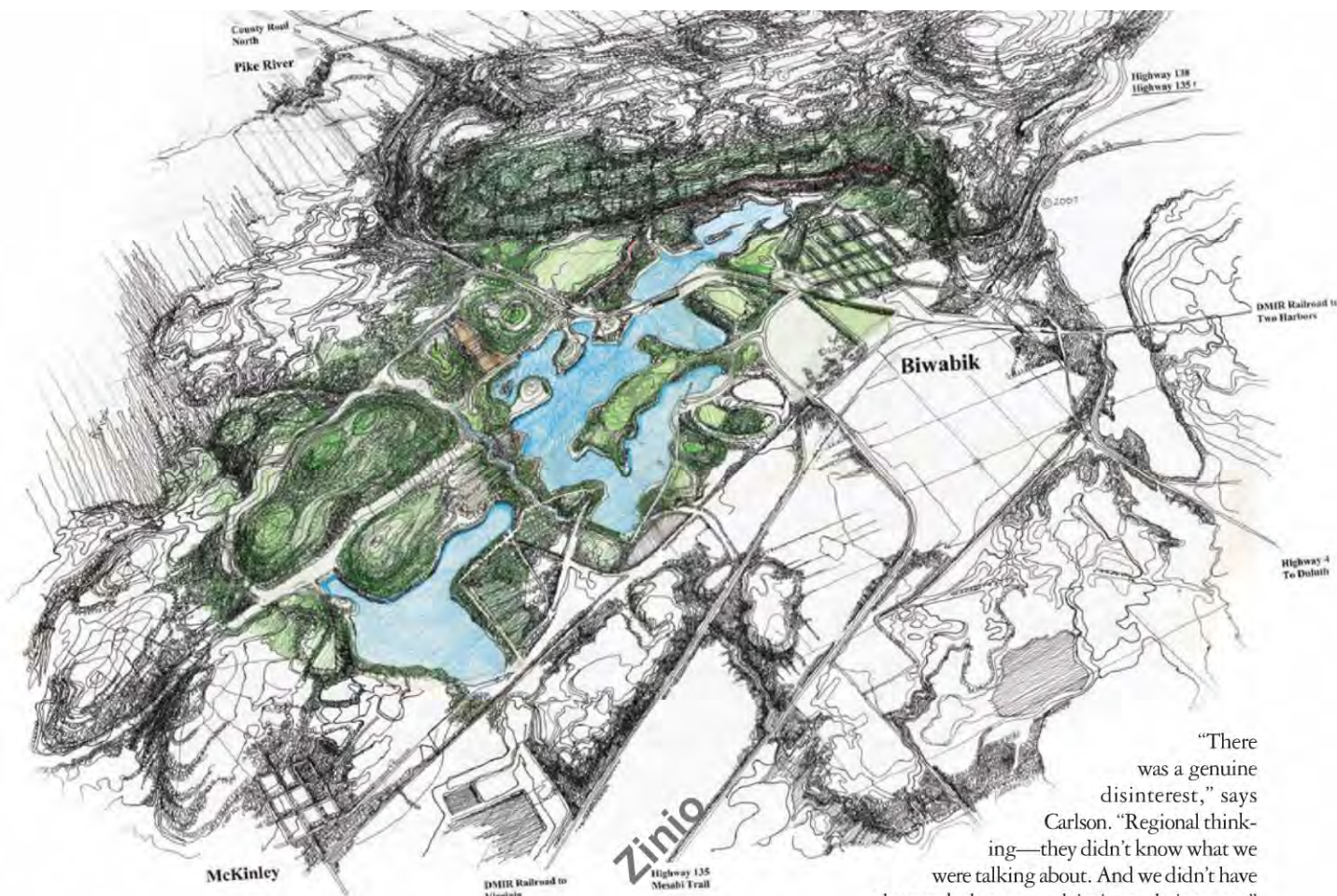
With the partnership remaining ad hoc, and some of the charrette concepts perhaps larger than the collective local imagination, it remains to be seen precisely how—or whether—the design opportunities will play out. “There are two parts to this,” says LV cofounder Chris Carlson. “The physical capacity—the technical, landscape architecture piece—and the social capacity: Who is going to help keep this vision alive?”

But a legacy born of landscape architecture is taking root. Carlson, her LV cofounder John Koepke, ASLA, and her husband, Steve Durrant, ASLA, have completed a grading plan for part of a new mine outside Biwabik, Minnesota, that incorporates natural slopes and drainage swales as well as a 500-foot-long figurative earth sculpture. With \$100,000 from a mine-funded DNR program, Carlson and Koepke are developing a course for mine engineers, to be taught in 2009.

Beyond these tangible elements, the landscape architects have accomplished something remarkable in this northern Minnesota community. With the tools of plain talk and persuasive drawings—and more meetings than anyone can count—they have helped create partnerships in a region where collaboration has not been the typical way of conducting business.

A FEW HOURS’ DRIVE NORTH of the Twin Cities, the landscape begins to change. Rich agricultural fields and oaks give way to reluctant cropland, white pine, and black spruce. In

JAMES PETTINARI



places the soil appears red and bedrock peeks out. Somewhere, too, the populace changes, and residents aren't Minnesotans so much as they are "rangers."

"Anything from outside that region is suspect," says Mirja Hanson, a facilitator with a community development background and an early key player in LV. "More than any other area in the state, anyone from outside needs to establish their value." Or, as Carlson quips, "You're guilty until proven innocent."

Furthermore, rangers have had something of a love-hate relationship with the mines, which have both provided jobs in boom times and taken them away during downturns. In 1999, when Carlson and Koepke first sought meetings with range stakeholders, the region was marked by ethnic, municipal, and corporate rivalries.

Koepke, then chair of the U of M Department of Landscape Architecture, Minneapolis, and Carlson, a senior research fellow and adjunct professor there, were friends with a shared interest in natural resources and community process. Had they taken the rangers' initial reception as a cue, the project would have been over before it started.

A charrette vision shows the area near Biwabik circa 2050, after mining and land shaping is complete and groundwater has filled the depressions.

Mining practices had made lakes that were inaccessible to humans and challenging habitat for wildlife, as well as steep ziggurats of earth unsuitable for building.

"There was a genuine disinterest," says Carlson. "Regional thinking—they didn't know what we were talking about. And we didn't have the vocabulary to explain it on their terms."

Although a university scientist was responsible for the taconite extraction process, which kept the mining industry going following the depletion of accessible high-grade ore in the 1950s, the rangers "didn't want to be told anything by the U of M," says Carlson.

But the project wasn't something the landscape architects were willing to let go, and they weren't the only ones who were interested. The university had initially been approached in 1997 by a mining executive, Jim Swearingen, then general manager of U.S. Steel's MinnTac mine in Mountain Iron, Minnesota. Swearingen and Dennis Hendricks, regional real estate manager for U.S. Steel, originally sought advice on their own mines, having seen good results from a partnership between U.S. Steel and a landscape architect in an Alabama reclamation process. "MinnTac was mining 90 million tons of ore a year. Of that, only 16 million ends up as product—the rest is put back into place [as waste rock]," explains Swearingen. "We were beginning to ask: Are we putting the materials back in a way that gives us the most desirable end result?"

The U of M Landscape Architecture Department had to decline what essentially



would have been a corporate consulting gig, but instead proposed a bigger idea: a regional planning process that suited its public mandate and could potentially involve many towns and mining companies. While the state economic development agency Iron Range Resources (IRR) had reclaimed several smaller mines as recreational lakes (one aptly named Lake Orebegon) and helped develop one old mine as a tourist attraction, the design stopped at the site level. No one had pushed the idea of reshaping the biggest mines, nor looked hard at how those mines would eventually close and continue to affect the region's future—for better or for worse.

For the designers, part of the project's appeal was its scale: an ongoing land-shaping process that moved around huge quantities of earth free of charge. How much better to have a design in place that would offer opportunity for future development and habitat reclamation, rather than serve as an impediment, as minimal state reclamation requirements allowed.

Supported by an initial grant from the nascent University of Minnesota Design Institute, Carlson, Koepke, and David Pitt, another landscape architecture professor at the university, began work in 1999, energized by the prospects but stymied by the cold shoulder they received at meetings with stakeholders. So rather than jump in to the design first, they took a step back. In

Rather than a steep-sided, inaccessible pit, landscape architects envision a marina for one of the lakes that will occur when mining near Biwabik is complete.

For the designers, part of the project's appeal was its scale: an ongoing land-shaping process that moved around huge quantities of earth free of charge.

examining the regional knowledge base they saw a missing piece, which, if they could provide it, might help them prove their worth on the range.

In partnership with the DNR, the IV produced an atlas, *Mine Lands and Mineral Resources of the Mesabi Range Area*, a GIS database and map set depicting land cover, geology, and—most important—long-term projections for mining in the region. Until then, this latter data wasn't publicly available, and communities, developers, and even

state transportation officials operated somewhat blind. There was a tendency to locate things in the wrong places—places, like the original site of Hibbing, that were in the way of mining iron.

The atlas, says Hanson, “was the first sign of trust and value. It didn't reveal who owned the ore, but where it was, and when there was likely to be mining.” U.S. Steel was “forthcoming” with its future mining plans, she says, and the other companies followed. For the first time communities could see the big picture of what was in the ground and when

it would start being extracted. After that, doors started to open for the IV believers.

HANSON, A FACILITATOR who had worked with U.S. Steel, already knew something of the dynamics on the range. A neutral third party, she worked to engage stakeholders, allowing

JOHN KOEPKE, ASLA

EDITOR'S CHOICE

2001, the team members set goals, built working relationships, and ferreted out funding (which would eventually come from the state legislature; the U.S. Steel, Blandin, and Virginia foundations; IRR; DNR; Minnesota Power; and others). The meetings brought together individuals from more than 20 organizations: municipalities, mine companies, IRR, various DNR and U of M departments, and others. Dan Jordan, mining and minerals program supervisor at IRR, was a regular at those early meetings, which both he and Koepke recall being described as "wallowing in the mud." But though the process was a little messy, Jordan was impressed by the caliber of the participants and felt they had built something by mid-2000: "We had the skeleton; we just had to hang some meat on the bones."

To engage mine managers and engineers, Carlson brought in Tony Bauer, FASLA, an expert on aggregate mine reclamation (see "Master Excavator," *Landscape Architecture*, November 2004), with whom she had collaborated years earlier on a Seattle-area mine reclamation. Bauer, who spoke the language of the industry, had "instant credibility," says Carlson, when he presented the mine executives with examples of mine transformations and varied end-use options, from housing to natural resources. The message: The Laurentian visionaries were not just dreaming.

Carlson, Koepke, and Pitt to function as members of the partnership. During 13 meetings from September 1999 to July

By 2001, the academics had abandoned the idea of working on the range as a whole. When Pitt's graduate design studio presented a regional vision called "Avenue of the Mines," IV partners were intrigued, says Koepke, "but we realized that we had to break it down into smaller chunks. It's hard to get your head around a 120-mile stretch of land."

The first "chunk" to be bitten off was the city of Virginia, which needed room to expand, and the neighboring Auburn Mine, which would eventually leave reclaimed rock piles and a large lake on the edge of town. A real design issue, a receptive mayor, Terry Leoni, and a critical mass of interested stakeholders—the ingredients for a productive charrette were all there. Would the reclaimed mine land hem the town in or create opportunities? The IV designers were ready to show how it could be the latter.

Two participants were particularly well suited for the charrette: urban designer and architect James Pettinari, whose eloquent birds-eye perspective drawings were ideal for showing the large landscape concepts, and Roger Martin, FASLA, founder of the U of M Department of Landscape Architecture. Besides being top-notch designers and artists, both are plain-spoken men who were born and raised on the Iron Range. Koepke and Carlson also enlisted a handful of U of M landscape architecture grad students who had grown up on the range.

At this and a subsequent charrette in 2003 in Hibbing, designers came up with concepts to transform towns: rerouted high-



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ways, recreational trail systems, and postmine landforms that could support either housing or ecological function.

Designing for a mine landscape isn't the same as designing any other place. While there is no difficulty in moving earth—one truck carries 240 tons—iron mining imposes rules and a specific sequence regarding where earth ends up. When a mine is opened or expanded, topsoil or overburden is stripped off and stockpiled. Rock determined to have sufficient iron content is removed and processed off site into taconite pellets. The fine materials remaining after processing, called tailings, are circulated and filtered through huge basins linked to the processing plants. Rock with a lower percentage of iron becomes towering landforms. While processing this waste rock is not economical now, extraction technology and future demand for iron—or other minerals—may make some of today's waste rock the stuff of tomorrow's profits, so it must remain to some degree accessible and must not obscure undisturbed land known to contain minerals. Any alternate design or grading had to occur in areas where mines were opening or expanding so it became part of the process, not rework that would incur added cost to a mining company.

The mining process isn't all limitations; it also makes for some colossal opportunities. In a number of communities future mining will necessitate new alignments of major roads. Five-mile-

long mines, when closed, will eventually fill with groundwater, some joining one another to become enormous lakes with no crossings for terrestrial wildlife or humans. Appropriate grading and improved land cover could make the difference between a rugged wasteland and a rich forest replete with trails and migration corridors, or between steep drop-offs and hospitable lakeshore lots.

When mines close, current Minnesota regulations basically require that the earth remains in place and presents no hazards, resulting in benched slopes and minimal vegetation. Some LV partners have suggested using the LV process to improve state regulation standards, but, as Carlson notes, "Regulations don't necessarily result in good land management." Besides, says Marty Vadis, director of DNR's Division of Lands and Minerals and a longtime LV participant, "That would go against what we're trying to do here, to work cooperatively."

In April 2007, the third and most recent charrette was held outside Biwabik (population 830). Changes were ahead. Arcelor-Mittal, with headquarters in Luxembourg and London, was preparing to open the East Reserve of its Minorca Mine less than a mile east of downtown Biwabik. County Road 715 will eventually have to close or be rerouted to accommodate one of the pits, which, with its sister to the east and two proposed stockpiles,

Designing for a mine landscape isn't the same as designing any other place.

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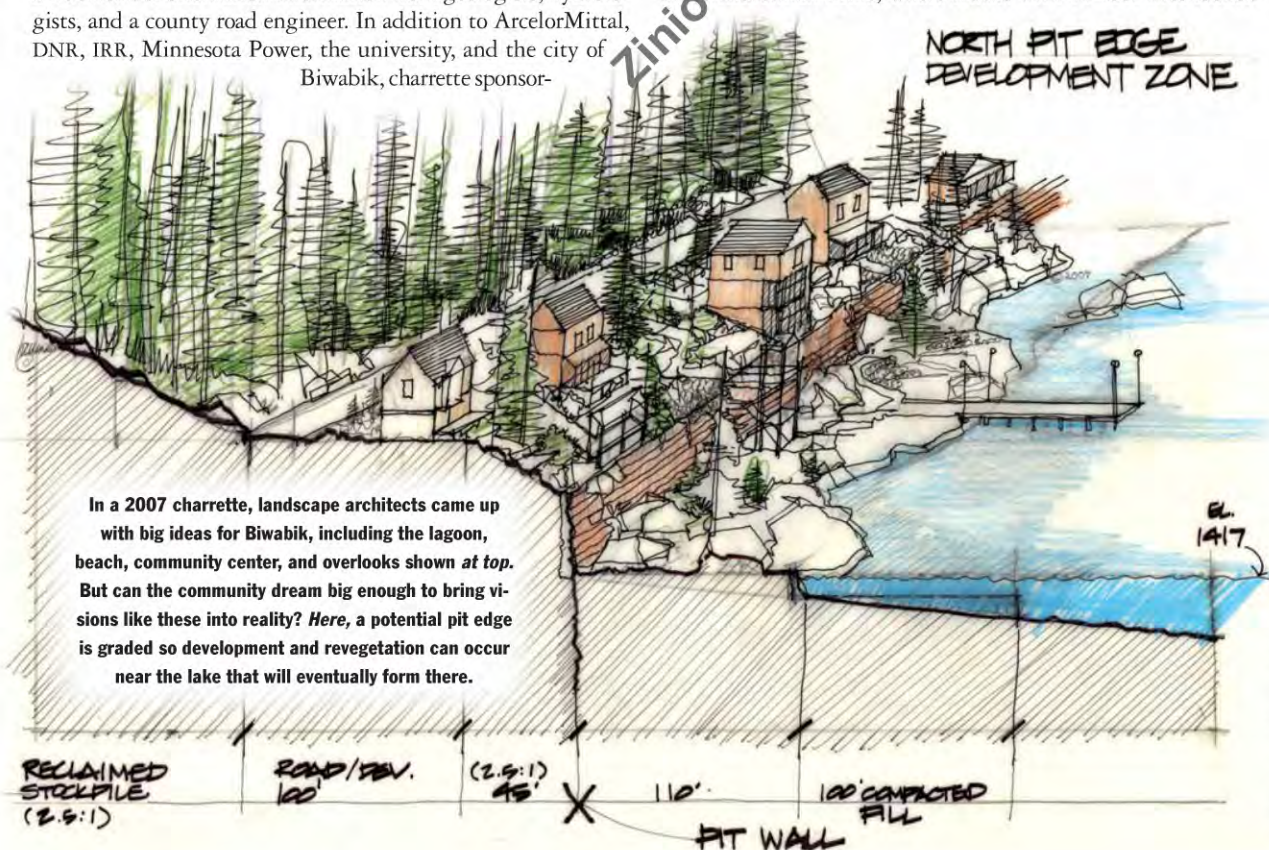
EDITOR'S CHOICE



Appropriate grading and improved land cover could make the difference between steep drop-offs and hospitable lakeshore lots.

will cover an area about three times the size of the town. What should this new landscape look like, and how could it be used? Over three and a half days, the designers sought to figure it out, with help from ArcelorMittal mine engineer Steve Mekkes and a truckload of orientation information from geologists, hydrologists, and a county road engineer. In addition to ArcelorMittal, DNR, IRR, Minnesota Power, the university, and the city of Biwabik, charrette sponsor-

participants included an owner of mineral rights in the area, Tom Gardner, and representatives of Giant's Ridge, a golf and ski resort seeking to expand outside Biwabik. Day one was immersion in the topic and tours of nearby sites, including the enormous Laurentian Mine, where trucks with 11-foot tires looked



In a 2007 charrette, landscape architects came up with big ideas for Biwabik, including the lagoon, beach, community center, and overlooks shown at top. But can the community dream big enough to bring visions like these into reality? Here, a potential pit edge is graded so development and revegetation can occur near the lake that will eventually form there.

JERRY SHAPINS, TOP; JAMES PETTMAR, BOTTOM

EDITOR'S CHOICE

like toys in the distant bottom of the pit, and the Canton Pit Lake, a landscape drama of red cliffs and impossibly blue water.

For the next two days, the designers immersed themselves in the ArcelorMittal site and its issues.

Though this project involved his competitor's mine, Dennis Hendricks of U.S. Steel stopped in at the final presentation, where landscape architects waxed poetic about connections and green space and carefully choreographed views, and engineers admitted that the plans actually could work in the context of mine operations. The Biwabik residents, including a new town manager, had a bit of that deer-in-the-headlights look while absorbing the visions of lakeshore homes, fishing, and boating access, and a landform shaped like a sleeping giant (a translation of the Ojibwe word "Mesabi") stretched out on the edge of their town. During the open house, Carlson recalls one resident saying: "We can't even pay for street cleaning, and you're talking about rebuilding our town."

AND THERE'S THE RUB. The mines can create hills and lakes, but can the residents dream big enough to plan how to use them?

In the months following the 2001 charrette in Virginia, interest was so high that attendance at partnership meetings doubled to as many as 70. However, the charrette designs have not gotten

off the drawing board. Some unfortunate timing no doubt played a role: EvTac, then owner of the Auburn Mine outside Virginia, went bankrupt not long after the charrette. Mayor Leoni took another job, and road disruption is still years into the future. Following an economic slowdown and subsequent resurgence of steel prices, most mines have changed hands in the past five years, with new staff and owners more far-flung than ever.

But U.S. Steel has employed some of the charrette principles in its MinnTac mine, such as establishing 300-foot benches between slopes, 10 times wider than reclamation rules require. Quarterly LV meetings are hosted by the IRR, which since 2007 has devoted a half-time staff position to coordinate the still ad hoc partnership. LV has secured funding for phase one of another digital mine atlas project, this time focusing on old underground mines that could be critical for future development. Data on these long-abandoned mines had been squirreled away in storerooms and largely forgotten until cave-ins occurred following groundwater changes caused by dewatering active mines.

Perhaps the most significant activities are occurring in Biwabik, where the ideas from the 2007 charrette are percolating. ArcelorMittal has committed to the alternate grading plan for one of its new mine stockpiles, introducing gentle landforms, natural drainage ways, and a giant's head and belly rising 200 feet above its base.

Jim Swearingen, the original Laurentian visionary, is determined to steer Biwabik toward its future, and his recent election



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to the city council puts him in a position to do so. The charrette was a source of "some wonderful ideas—a beginning point," says Swearingen. "How do you take a major resort [Giant's Ridge], a little town like Biwabik, and a big new mine—how do we meld that all together?" He has organized a committee called the East Central Laurentian Vision Work Group, which includes Gardner, the mineral rights owner, and mine engineer Mekkes.

Mekkes was skeptical approaching the 2007 charrette. Though he supports the LV principles and was relieved that the landscape architects remained in "the realm of reality" during the charrette, he retains some skepticism regarding the Laurentian Vision for Biwabik. "In one sense, it's too grand," says Mekkes. "But it's also a repetition of other lakes and beaches (e.g., Lake Orebegon) that have been developed."

If Carlson has her way, Mekkes and his mine engineer peers will become the next group of LV believers, who, with their responsibility for grading and reclamation plans, will be best equipped to manifest the vision. Carlson, now living in Portland, Oregon, and Koepke, in Minneapolis, are developing a pilot course for mine engineers to be taught in early 2009. Jerry Dombek, U.S. Steel area manager for engineering and development, thinks this is a great idea. He has already exposed what he calls his "pretty

young" engineering staff to the Laurentian Vision by bringing them to observe the Biwabik charrette and feels the course will offer them "a little something different to look for" when preparing reclamation plans. As Koepke says, "We're going to teach mining engineers to think like landscape architects."

While Carlson and Koepke would like to see more visible transformations on the range, they remind themselves that *vision* and *partnership* aren't physical things. "The idea of the Laurentian Vision has been integrated into people's thinking," Koepke explains. "It will eventually end up being a physical solution, but what's really important is the change in attitude."

The mining industry—which essentially created the economy and landscape of the range—has been a fickle parent. Providing, then withholding, it is now poised to continue for another 30 to 50 years or more. With nonferrous mining and new iron refining technologies around the corner, no one is sure what the future will look like.

The Laurentian Vision Partnership, 10 years old next year, still has time to decide.

Diane Hellekson, ASLA, is a landscape architect with HNTB Corporation in Minneapolis.

"It will eventually end up being a physical solution, but what's really important is the change in attitude."

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